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ISTHMIAN CANAL TRAFFIC.

THE Isthmian Canal Commission had an extended economic and statistical investigation made for the purpose of measuring with all possible accuracy the tonnage of ocean shipping and commerce that would use the proposed waterway. The latest available American and European statistics of commodity imports and exports and of vessel entrances and clearances were critically examined to determine the commerce that would have been served by the canal, had the proposed route then been open. This indicated the traffic available in 1899. That having been ascertained, an estimate was made of the tonnage that will be available for the canal in 1914, by which time it was assumed the waterway will have been opened.

The purpose of this paper is not so much to state the results of the Commission's investigation as to explain the methods by which the results were reached. The

investigation required an extensive use of official statistics, and it is possible that a description of the difficulties encountered in the investigation may throw some light upon the character of commercial statistics. A statement of the methods employed will enable economists to pass judgment on the accuracy of the results.

There were two distinct statistical investigations made by the Commission: One consisted of an examination of statistics of the imports and exports of the United States and of several European countries to determine how many tons of *cargo* or how much freight the trade of those countries might have contributed to the traffic through an American interoceanic canal in 1899. The other inquiry was to ascertain the tonnage of the *vessels* that would have passed through the waterway. In this latter study the data used were the statistics kept by the leading commercial nations of the entrances and clearances of the vessels engaged in the commerce between ports so situated that their maritime trade might have advantageously used the canal. It was fortunately possible to compare the results of these two investigations not only with each other, but also with the results of a third and very different study made by the New Panama Canal Company, which from 1894 on had kept a record of the actual movements of ocean vessels.

Inasmuch as the use made of the canal will be affected by the tolls charged, it was necessary to have the influence of tolls in mind in studying the tonnage of available traffic. The plan followed was to consider the effects which a toll of one dollar per vessel ton, *net* register, would have in diverting possible traffic. This toll is only half that charged by the Suez Canal Company, but the United States government will hardly be disposed to levy a toll of more than a dollar per ton net register. Indeed, the

charge will probably be less. However that may be, a toll of a dollar a ton net register would prevent but little commerce from using the canal, while a toll that much exceeded a dollar would probably considerably restrict the tonnage. This conclusion was reached as the result of a study of the distance and time that would be saved by the commerce of all the countries so situated that their use of the canal, instead of existing routes, would depend on the tolls. The economy in distance and time for each doubtful route through the canal was converted into the saving in the expense of operating vessels and this sum was compared with the amount of toll which the vessels would have to pay for using the canal.

Cargo Tonnage of Traffic Available in 1899.

The statistics of the internal commerce of the United States and of other countries give the volume of business in tons. The traffic of the railways, rivers, and canals, and the productions of our mines and furnaces are measured by the ton unit; and the same is true of the products of our farms and forests when in the possession of the transportation agent. The statistical units of weight most familiar to the people of the United States are the short ton of 2,000 pounds and the "long" ton of 2,240. The long ton is not employed so much in this country as it formerly was; but in the United Kingdom the ton of 2,240 pounds is still more generally used than the short ton. In countries that have adopted the metric system of weights and measures the ton weighs 2,204 pounds.

In the government statistics of ocean commerce no record is made of the cargo or weight tonnage of the commodities carried, and the volume of business done is expressed in terms of vessel tonnage. The "gross register

tonnage" of a ship is the capacity of its hull in cubic feet divided by 100, and its "net register tonnage" is determined by dividing by 100 the cubic feet of space available in the vessel for cargo. Maritime commercial statistics are usually given in net register tonnage. To those who are directly concerned with maritime commerce the statistics of vessel tonnage are a readily understood index of the volume of commodity traffic; but to many, if not most men engaged in industrial pursuits, the cargo ton of 2,000 or 2,240 pounds is the customary unit employed in measuring the volume of trade, and the figures of net tonnage have little significance until they have been converted into tons of weight.

The business world being accustomed to consider the amount of traffic in terms of the cargo ton, a statement in that unit of the volume of available canal traffic conveys definite information readily comprehended without being translated. The statistics of the cargo tonnage of ocean commerce permit comparisons to be made with the statistics of internal traffic, while statements of vessel tonnage do not. The saving in freight rates, furthermore, that the opening of an Isthmian Canal would make possible can be more intelligently considered by knowing the volume of cargo freight that would use the waterway. Ocean rates, like railway freight charges, are levied on the cargo ton of weight or measurement; but, unlike the statistics of railway traffic, those of maritime commerce give no data regarding freight tonnage.

The United States Bureau of Statistics collects the statistics of our foreign trade, and in its monthly and annual publications gives the value of imports and exports by classes of commodities and by ports. Tables are also published giving the values, and, in many cases, the quantities of the commodities exported from each

port to foreign countries as a whole. Similarly, the values and usually the quantities of the imports entering our several ports from foreign countries taken collectively are given. Though these tables are elaborate and of great value, they do not give the amount of trade by articles and quantities carried on between our several ports and the countries with which we exchange commodities. It is not possible to obtain the actual cargo tonnage of the total foreign trade of the United States directly from our official statistics, because the published tables seldom give the weights of the commodities, frequently do not state the quantities, and in no instance is the ocean freight tonnage stated. This is equally true of the commercial statistics compiled by foreign countries.

It is likewise impossible to ascertain from the published tables the kinds and quantities of commodities that constitute the trade carried on through and by our several ports with different countries. Our published statistics indicate the foreign trade carried on at each port of the United States; and the distribution of our entire trade among the several countries is shown, but it is in the form of total values. The Bureau of Statistics possesses the data necessary for this analytical presentation, by articles, of the trade of our respective ports with each foreign country; but the tables which such a presentation would require would be so voluminous as to make their publication for all ports impracticable. A table would need to be constructed for each port or customs district, showing its trade with each foreign country in each article or class of articles imported and exported. There are at the present time more than 50 maritime customs districts trading more or less with 92 foreign countries by exchanging some or all of the 661 articles in the classified list of the commodities.

Not being able to obtain from the published tables the data necessary for the calculation of the cargo tonnage of our ocean commerce that would now make use of an Isthmian waterway, resort was had to the unpublished folios, access to which was courteously given by the United States Bureau of Statistics. The facts concerning the trade of each port were copied from these folios, and two sets of tables were constructed, one for the Pacific ports of the United States and one for the Atlantic. The tables constructed for the Pacific ports showed for each port the values, and, when obtainable, the quantities of each class of articles imported and exported in the trade carried on with each foreign country on the Atlantic. Similar tables were made giving the trade of each Atlantic port with each Pacific country. Having secured the mass of data contained in these compilations, the work of converting quantities and values of commodities into their cargo tonnage equivalents was begun, and the results of the calculations were four comparatively small tables giving the values and the cargo tonnage of the imports and exports composing the trade which our Pacific ports had with the Atlantic countries in 1898–99, and which our Atlantic ports had with Pacific countries the same year. The four tables showed respectively (1) the value and cargo tonnage of the imports into each of our Atlantic ports from the Pacific foreign countries traded with; (2) the exports from each Atlantic port to those countries; (3) the value and cargo tonnage of the imports into each Pacific port from each Atlantic foreign country dealt with; and (4) the value and cargo tonnage of the exports from each of our Pacific ports to each Atlantic country to which commodities were sent. These tables are too large and detailed to be conveniently reproduced here, but they can be summarized as follows:—

VALUE AND CARGO TONNAGE OF THE TRADE WHICH THE UNITED STATES WOULD HAVE HAD THROUGH AN ISTHMIAN CANAL DURING THE FISCAL YEAR ENDING JUNE 30, 1899.

	Pacific Coast.		Atlantic Coast other than with Hongkong and Philippines.	
	Values.	Cargo Tons.	Values.	Cargo Tons.
Imports . .	$5,435,003	300,829.8	$33,751,161	534,371.6
Exports . .	18,352,450	715,682.9	40,210,860	1,020,514.9
Total . .	$23,787,453	1,016,512.7	$73,962,021	1,555,886.5

	Atlantic Coast with Hongkong and Philippines.		Total Atlantic.	
	Values.	Cargo Tons.	Values.	Cargo Tons.
Imports . .	$6,059,678	99,200.9	$39,810,839	633,572.5
Exports . .	1,959,975	151,540.2	42,170,835	1,172,055.1
Total . .	$8,019,653	250,741.1	$81,981,674	1,805,627.6

Grand total: values, $105,769,127; tons, 2,828,013.3 (including 873 tons miscellaneous exports of foreign exports).

In constructing the tables, the trans-Atlantic trade of our Gulf and Atlantic ports was omitted because it would not be tributary to the canal; and the figures include only the ocean foreign commerce now carried on by our Atlantic and Gulf ports with Pacific countries, and between our Pacific ports and countries on the Atlantic. In the case of each port named, only that part of its foreign trade was taken that might be directly affected by the opening of the canal.

According to the classification of the United States Bureau of Statistics the imports number 333 classes and the exports 328. For each item in this list of 661 com-

modities the value was obtainable. For some of the classes the number or quantities of articles were reported; and, for many commodities, weights were given in the official statistics. In all cases, however, the weights given were net, covering only the commodity and not the packing or "tare" which constitutes a part of the freight cargoes whose weights were to be ascertained. In order to determine the weight of the tare corresponding to the weight or value of the ordinary unit of each of the many commodities considered, a large amount of detailed information had to be secured from business men concerning the manner of shipping the various articles. The difficulties of this and other parts of the investigations were somewhat complicated by the fact that many commodities of bulky character are handled by ocean vessels as measurement cargo, 40 cubic feet being reckoned as a ton instead of 2,240 pounds, the weight ton commonly employed in maritime traffic. In determining the true cargo tonnage of goods shipped by the measurement ton, it was necessary to ascertain the cubic contents, boxing included, of some unit of quantity.

To reduce commodity values to weights, to find the average tare for net weights, to learn whether shipments were made by weight or measure, and, if by measure, to find the weight or value of a measurement ton, an extensive correspondence was carried on with men engaged in foreign trade. Representative business men of the leading commercial cities were requested to give the assistance needed; and by means of personal interviews and a large correspondence a mass of information was secured, covering the great bulk of both our import and export trade. In order to insure the greatest possible accuracy for the tables of cargo tonnage, inquiries regarding each line of foreign trade were made of representative

firms of several of the large seaports, and in some instances several firms were corresponded with concerning each commodity about which information was required. This correspondence extended over several months, and required the sending out of several thousand individual letters; but by means of the knowledge obtained from the business men, who generously gave the time required to reply to the requests for information, it was possible to prepare the tables by converting, item by item, into equivalent cargo tons, the values of nearly all of the articles that our various ports would have imported and exported by way of an Isthmian Canal during the fiscal year ending June 30, 1899. Although it was not possible to get the requisite data for converting every item, however, there are but 5.7 per cent. of the imports and 0.4 per cent. of exports included in the above table that were not converted according to the method just described. The small quantity of imports and exports for which it was not possible to secure satisfactory factors to use in changing values of cargo tons were converted by using for a multiplier a ratio of values to tons, chosen separately for each coast of the United States and also separately for the imports and exports, with reference in each instance to the nature of the commodities being considered.

The total value of the maritime commerce of the United States that might have used an Isthmian Canal to advantage during the fiscal year ending June 30, 1899, was $105,769,127. Of this total trade the Pacific ports had $23,787,453 worth, and the Atlantic, including their trade with the Philippines and Hongkong, $81,981,674 worth. Whether all the trade carried on between our Eastern ports and the Philippines and Hongkong may properly be included in this total value of the commerce of the United States available for canal traffic is an important

question that is considered in the discussion which follows regarding the entrances and clearances of the vessels that would have used a canal during the past year. In this connection it is sufficient to note that the value of the trade of the Atlantic Coast ports of the United States with Hongkong and the Philippines has been stated separately.

The value of the exports from our west coast to Europe in 1899, $18,352,450, and the corresponding cargo tonnage, 715,682.9 tons, were abnormally small because of the severe drought of the year 1897–98. The larger part of tonnage export of that section consists of grain, and during the year 1898–99 the grain exports were less than 50 per cent. of their average for the five years preceding. If the value of the grain exports of the Pacific Coast for the fiscal year 1898 be substituted for those of 1899 in the above table, the total value of the west coast exports would have equalled $40,299,881. The exports other than grain had practically the same value in 1898 and in 1899. Had the grain exports of 1899 been equal to those of 1898, or, in other words, had their amount been normal, the cargo tonnage of the west coast exports would have been 1,328,-757 tons instead of 715,682.9 tons, the figures in the above table; and the total cargo tonnage, instead of having been 2,823,013.3 tons, as stated in the table, would have been 612,874.1 tons more, or 3,435,887.4. This larger total is a much more accurate expression than is the smaller total of the cargo tonnage of our maritime foreign commerce available for canal traffic during the year under consideration. This larger sum will be used in the comparison that will subsequently be made with the tonnage estimates derived by other methods of investigations that will be described later.

Up to this point only the cargo tonnage of the commerce of the United States has been considered. The large mass

of information which the investigation of American trade had furnished regarding the relation of values and quantities to cargo tonnage was equally applicable to the commerce of foreign countries; and this information enabled the conversion of the greater part of the trade of other countries to be made easily and quickly. The commodities not changed from values to tons by the direct method were converted by means of averages chosen by a method similar to that used in the conversion of American imports and exports.

It was not considered necessary to determine the cargo tonnage which every foreign country now has available for canal traffic. By taking the nine European countries,—the United Kingdom, France, Germany, Belgium, Holland, Austro-Hungary, Italy, Spain, and Sweden,—nearly all the commerce which foreign nations would have with the west coast of America and Hawaii was reached. Norway had no commerce with this section, and that of Greece and Russia was slight. The trade of Europe with our west coast was included in the study of our canal commerce. The detailed table of the trade with the west side of South and Central America may be summarized, as follows:—

SUMMARY OF CARGO TONNAGE OF EUROPEAN IMPORTS AND EXPORTS. TRADE WITH SOUTH AND CENTRAL AMERICA, BEGINNING OF 1899.

	South America.	Central America.	Totals.
Imports	2,041,147	75,320	2,116,467
Exports	999,805	54,556	1,054,361
Totals	3,040,952	129,876	
Grand total			3,170,828

Whether the entire commerce of Europe with the west coast of South America would make use of the Isthmian Canal will depend somewhat on the canal tolls. In general, the canal will secure nearly all of this trade unless the tolls should be so high as to make the longer and less desirable route around the Horn or through the Straits of Magellan more profitable. The only trade that would not pay a moderate toll of a dollar a ton net register for the privilege of using the canal is that of Chile south of the 40th parallel of latitude; and the commerce of that section is not, and can hardly become, of much consequence.

It will be seen that nearly two-thirds of the entire cargo tonnage of the trade between the nine European countries and the west coast of Spanish America consisted of imports from South America. Four-fifths of these imports were from Chile. This indicates the present prominence of the nitrate of soda trade. In cargo tonnage, Germany ranks first among the nine nations in the trade with the west coast of Spanish America; but in value of commerce the United Kingdom is much ahead of Germany because of the high value of the British exports. Germany's large import tonnage is made up mostly of nitrate of soda for use in her chemical industries, and her exports contain some coal, but consist largely of manufactures. The coal exports of the United Kingdom are heavy, but the exports as a whole derive their value mainly from the manufactures.

The cargo or freight tonnage of Europe's trade with Hawaii and British Columbia in the fiscal year 1899 is shown in the table on the opposite page.

In this table the figures are based upon statistics kept by Hawaii and British Columbia. The vessels entering Hawaii take cargoes mainly of sugar to the United States,

CARGO TONNAGE.

EUROPEAN TRADE WITH HAWAII AND BRITISH COLUMBIA.

	Hawaii.	British Columbia.	Totals.
Imports	33,793	37,334	71,127
Exports		24,699	24,699
Totals	33,793	62,033	95,826

hence there are no exports from Hawaii given in the table. The British Columbia trade during the year ending June 30, 1899, was but little more than two-fifths that of the previous year, and for that reason the totals of the above table are unduly small; but, for the sake of presenting the latest data, it was thought best to retain the figures for the year 1899.

The cargo tonnage of the European trade with the west coast of Mexico is not obtainable because the European statistics do not separate the commerce with the east coast of Mexico from that with the west coast.

The total freight tonnage of the trade between European countries and Western South and Central America, British Columbia, and Hawaii during the latest statistical year for which information was obtainable was 3,266,654 tons. This total does not comprise the commerce with the west coast of Mexico. Moreover, it does not include any of the commerce between Europe and Eastern countries, a part of which would pass through the American Canal. In studying the tonnage of cargo that the commerce of the United States might have furnished the canal in 1898 and 1899, the total was found to be 3,435,887 tons. The sum of these two totals is 6,702,541. These are figures applying to the commerce of the past, carried under the conditions then prevailing. They do not refer to the future.

Tonnage of the Vessels that would have used an Isthmian Canal in 1899.

Inasmuch as all important commercial nations record the entrances and clearances of the vessels trafficking at their ports, and state with which countries the vessels trade, it is theoretically a simple matter to determine the tonnage of the vessels at present following routes for which the canal route would be substituted. As a matter of fact, however, the statistics of entrances and clearances have certain important limitations due to the fact that different countries follow dissimilar rules in making their statistical records. In some cases also the records are incomplete, as, for instance, the figures recording the tonnage of vessels trading between Europe, Mexico, and Central America do not indicate whether the European entrances from those countries are from the Atlantic or from the Pacific Coast. The same limitation exists as to European clearances to that section of the world.

The lack of uniformity of methods of collecting statistics of entrances and clearances may either result in a duplication of tonnage records or in an understatement of the tonnage engaged in the commerce of certain countries, and it is unfortunate that the statistics of international trade are not compiled in accordance with uniform rules. A vessel entering a German port is recorded as coming from the country that supplied the vessel with the largest share of its cargo. If this vessel were to enter a British port, she would be recorded as having sailed from the most distant country from which cargo was brought. The French practice is the same as the English. In compiling the statistics of clearances, it is the practice of Great Britain to record a vessel as clearing for the most distant country for which she has cargo. The German figures

credit the clearances to the country to which the most cargo is bound. The French practice is like the English.

Correspondence with the collectors at a number of the ports of the United States revealed the surprising fact that our statistics of entrances and clearances were compiled by various methods at different ports. The New York statistics recorded a vessel as clearing for the first or nearest country to which cargo was taken. The vessel was entered from the most distant country. At other ports, however, different practices prevailed, four variations in methods having been reported by our collectors of customs.

Although the American statistics of entrances and clearances are not compiled in accordance with uniform rules, there are probably no duplications in the figures. In fact, the practice of New York, from which the major share of our commerce moves, of recording a vessel as clearing for the first port of call for the discharge of cargo, is apt to lead to understatement rather than an exaggeration of the volume of outbound traffic destined for countries that will be reached by way of an Isthmian Canal. In the case of European statistics the following duplications are possible: (1) German vessels outbound may call at Holland or Belgium and be recorded there. These German vessels outbound might possibly, though as a matter of fact they seldom, if ever do, call *en route* at British ports. One German line calls at a French port. (2) German vessels inbound may call at a French, Belgian, or Dutch port; but, as a matter of fact, they do not call at Belgian or Dutch ports. Most of the trade from the west coast of South America to Europe is carried in full cargoes, and German vessels are not apt to make calls *en route* at European ports. This is indicated by the fact that the Belgian clearances in the South American trade

consist almost entirely of steam tonnage, while the entrances are made up mostly of sailing vessels. The same is true of the Netherlands. In regard to the French statistics there is some uncertainty. (3) Two British lines to and from the west coast of South America call at French ports. Thus the French statistics are liable to include some tonnage entered in the British and some contained in the German figures. (4) In the case of Spanish statistics of entrances and clearances it is possible that some British, some French, and some Italian tonnage may be included.

It is only in the statistics of the European trade with the west coast of South America that the duplications which concern us are possible. The following table summarizes the apparent vessel tonnage of the trade of European countries with Western South America. It was compiled from the latest figures then available, which in the case of the United Kingdom, France, Belgium, the Netherlands, and Italy were for the calendar year 1899, and for the other countries were for 1898.

EUROPEAN ENTRANCES AND CLEARANCES.

VESSELS TRADING WITH WEST COAST OF SOUTH AMERICA.

	Entrances.	Clearances.	Total Entrances and Clearances.
United Kingdom .	297,752	452,632	750,384
Belgium	110,750	103,577	214,327
Netherlands . . .	59,947	3,348	63,295
German Empire . .	256,870	141,452	398,447
Italy	13,218	10,180	23,398
Spain	77,156	139,599	216,755
France	325,358	153,251	478,609
Sweden	2,272	472	2,744
Total	1,143,323	1,004,636	2,147,959

The trade of Europe with Western South America apparently comprises a total of 2,147,959 tons. In order to determine more nearly what the actual vessel movement was, it was necessary to eliminate duplications as far as it was possible to do so. Efforts were made to secure information from the statistical departments of European governments, not only regarding the regulations which they follow in the compilation of their statistics, but also concerning the movements of vessels. The information obtained, however, was not sufficient to make possible the avoidance of a resort to estimates in making reductions from the statistical table above given.

Great Britain and Germany are so situated that they are the European termini of vessel movements between Europe and South America. Accordingly, the German and British figures for entrances and clearances may well be taken without alteration. Such, however, is not the case with Belgium, the Netherlands, France, and Spain, at whose ports both German and British vessels call *en route*. At Spanish ports, French and Italian vessels, as well as British, make more or less frequent calls. An examination of the Dutch and Belgian entrances and clearances shows that the vessels arriving consist of sailing vessels, and that those departing are nearly all steamers. This would indicate that the incoming traffic is carried by chartered sailing vessels with full cargoes. These sailing vessels, after discharging their cargo, doubtless depart for a British port in search of outbound coal cargoes. The steamers clearing from the Belgian and Dutch ports are in all probability mostly German vessels, although some British tonnage may be represented. In view of these facts it seems that the Belgian and Dutch figures for entrances should be retained in the total without alteration, but that some reduction should be made in the clear-

ances to avoid recording a vessel a second time whose tonnage has already been included in German clearances. The total clearances from Belgium and the Netherlands are 106,995 tons; but these clearances cannot all have been entered in the German figures, because the German clearances are much less than the entrances. It seems probable that the larger part of the tonnage of German vessels recorded as clearing for South America goes in ballast to Antwerp, and is not recorded in the German clearances. Just how much reduction should be made in the clearances of Belgium and the Netherlands must be entirely a matter of judgment. It was thought proper to take 30,000 tons from the total.

The largest amount of duplication in the tonnage figures doubtless occurs in the French statistics. There is one French line of steamers plying between France and the western coast of South America. English vessels call at French ports, and at least one German line makes calls *en route* at two French ports. The French entrances are 172,107 tons greater than the clearances, and it is probable that this excess of entrances over clearances is to be accounted for by the tonnage of chartered sailing vessels which bring full cargoes—mainly nitrate of soda—to France. This difference, then, ought to be included in the French figures. Furthermore, the figures which cover the entrances and clearances of the French line ought to be included. Probably 50,000 tons of entrances and a like amount of clearances will cover the vessel movements of that line of steamers. It is probable that the remainder of the total entrances and clearances, as shown in the French figures, is also comprised in the British and German statistics. It has therefore been thought proper to deduct from the French figures, as shown in the table, 206,502 tons; that is, the difference between 272,107 (the sum included) and 478,609, the total shown in the table.

Both British and French vessels call at Spanish ports, and probably Italian vessels occasionally do. The amount of commerce which Spain has with the west coast of South America is not much; and probably the figures for the entrances, 77,156 tons, cover all the commerce which that country has with the American section under consideration. The clearances are very much larger than the entrances, but the amount of outbound commerce is slight. It seems certain that the Spanish figures for clearances represent English and French vessels that have already been recorded in clearance statistics before reaching Spanish ports. Accordingly, it is believed that accuracy demands the subtraction of the Spanish clearances from the totals of the above table. The entrances and clearances of Italy are small, and doubtless represent the actual vessel movement between Italy and Western South America. The same may be said of Sweden. Russia does not appear in the table, because there were no vessel movements between her ports and Western South America during the year under consideration.

The reductions which the foregoing analysis suggests ought to be made amount to 376,101 tons, which, taken from 2,147,959 tons, the total of the table, makes the revised total 1,771,858 tons. The absolute accuracy of this corrected total cannot be asserted. At best it is only approximately accurate, and must be so regarded. It may possibly be as much as one hundred thousand tons in error, although that is hardly probable. There were various ways of checking these figures so as to determine whether they are approximately correct or whether they are largely in error. One general method was to compare the totals reached by the three separate statistical investigations. A study was made of the importation of nitrate of soda into European countries, the most important export

from Western South America; and the tonnage of British coal exports was also considered. The figures of nitrate and coal movements are in general accord with the distribution of vessel tonnage suggested in the above revision of the totals of the tables of entrances and clearances. Furthermore, the information that was obtained regarding the routes of steamers owned by European countries operating vessels in the South American trade supplemented the data supplied by foreign governments in such a way as to make it probable that the revised total of 1,771,858 tons fairly approximated the facts.

It is impossible to determine the amount of the trade and shipping passing around the Horn or through the Straits of Magellan between Europe and the west coast of *Central America and Mexico*, because Mexico and all the Central American countries except Salvador have ports on both oceans, and Germany and Italy are the only European countries whose statistics designate to which coast of these countries the published figures apply. The entrances and clearances for Salvador's trade with Europe and for the German and Italian trade with the west coast of Central America and Mexico amounted to 70,367 tons. This total does not include any of the trade across the Isthmus of Panama. In view of the importance of the United Kingdom in the commerce of the world, and in consideration of the fact that the larger part of the population, industry, and trade of Central America is on the Pacific side, it was deemed proper to double the above figures and to take 140,000 tons as the estimate of the vessel movements concerned with the trade between Europe and the west coast of Central America and Mexico.

The trade between the Pacific Coast of the United States and Europe comprised 213,798 tons, net register, of entrances and 360,254 tons of clearances,—a total of 574,052

tons. A large number of vessels cleared for Panama with traffic for Europe by way of the Panama railroad, but that traffic is not being considered here. The total entrances and clearances for the trade of British Columbia with Europe in 1899 amounted to but 43,092 tons. The previous year they were 106,485 tons. There are no clearances from Hawaii to Europe recorded. The ships take Hawaiian sugar to the United States, and clear thence for Europe or elsewhere.

Vessels trading between our Atlantic Coast and the west coast of South America, Eastern Australia, Oceania, Japan, and China will use the Isthmian Canal with the possible exception of a part of the vessels passing to and from Hongkong and the Philippines. A portion and probably the larger share of the Hongkong and Philippine trade will use the canal. The total entrances and clearances between our eastern seaboard and Hawaii and the countries of Western South America for the year ending June 30, 1899, were 166,364 tons. There was no direct vessel movement during that year between our Atlantic Coast and British Columbia and Pacific Mexico or Central America.

The vessel movements between the eastern ports of the United States and trans-Pacific countries comprised a total of 454,070 tons of clearances and 173,352 tons of entrances, —a combined total of 627,422 tons. There were special difficulties encountered in securing the statistics of the vessel movements between our western seaboard and Eastern countries, because the published figures of entries and clearances do not truly record the actual movements of vessels. This is due both to our practice of recording the statistics and to the fact that vessels stop going and coming at European and other countries on their voyages between the United States and the Orient.

The above figures comprise the tonnage of vessels which the records of our customs houses show to have made a voyage from our eastern ports to countries east of Singapore or to have entered directly from those countries. As a matter of fact, many vessels take cargoes from the United States to Europe, then load for the East, whence they may return to the United States either by way of Europe or by sailing in the opposite direction. A large part of our exports to the East are sent to Europe and there reshipped. Likewise a good portion of our imports from trans-Pacific countries come to us by way of Europe. The above figures are defective for two reasons. They give no information concerning the vessel tonnage employed in carrying our exports that went to Eastern countries by way of Europe and our imports that came from those countries by some European city. Again, they understate the tonnage of the ships that come from Eastern countries to the United States. Many of the vessels come by way of Java, and are entered from the Dutch East Indies. Others come by way of Europe, and are entered as from there. Some come from Chile.

A more adequate measure of the tonnage of the shipping engaged in the commerce between our eastern seaboard and Oriental countries would be secured by doubling the tonnage of vessels making the voyage directly to those countries. This larger total, 908,140 tons, is probably too small; but it was adopted as the best figure obtainable by the study of the statistics of entrances and clearances and of facts regarding commercial movements. One reason for thinking it unduly small is that the vessel tonnage of the commerce between our Pacific Coast and the trans-Pacific countries east of Singapore in 1899 amounted to 1,591,000 tons. While the vessel tonnage of this Pacific trade was doubtless greater than the vessel tonnage of the

American Atlantic trade with the countries east of Singapore, it does not seem probable that the latter tonnage was less than three-fifths of the former. Another reason for thinking that the vessel tonnage engaged in the commerce between our eastern seaboard and Eastern countries was fully as much as, if not more than, 908,140 tons during the fiscal year 1899, is that the Panama Canal Company's record of vessel movements between the American Atlantic seaboard and the Pacific section east of 90° east of Paris makes the total tonnage for the calendar year 1,271,357 tons. This total includes Singapore, Sumatra, and Java, and, should be larger than the total of 908,140 tons, but probably less than 363,000 tons larger.

From New York and the North Atlantic ports of the United States the distance to the Philippines and Hongkong by the American canal route will not be very much less than by Suez. Consequently, the trade of our eastern seaboard with those and other places so nearly antipodal will be divided between the easterly and westerly routes. The shipper will have the advantage of the competition of the carriers using the different canals. The coast between Shanghai and possibly Yokohama on the east, and Singapore and possibly India on the west, will be traversed in both directions by vessels bound for American ports.

The overlapping of trade routes in the East, and the tendency of vessels to follow the routes where the greatest volume of traffic can be secured, may possibly bring some of the East Indian trade across the Pacific and through the American canal. One of the advantages of the route by the American isthmus will be cheaper coal; and another inducement to vessel owners will be the shorter trip in tropical latitudes, where many commodities are liable to be injured by heat and humidity. Although a part of the Hongkong and Philippine trade with our At-

lantic seaboard will unquestionably make use of the Suez route, the figures have been allowed to stand without reduction, because the statistics of entrances and clearances collected at our Atlantic and Gulf ports do not include all of the present commerce of the eastern half of the United States with trans-Pacific countries that might use the American canal, were it available.

In considering the vessel tonnage of the existing commerce that might use an Isthmian Canal, some account should be taken of the shipping that now plies between Asiatic countries and our Pacific Coast. With China, Japan, and Siberia this amounts to 333,689 tons. With Hongkong and the Philippines the tonnage is 464,978, and for both sections combined 798,667 tons. A large but indeterminable part of this trade between the Pacific Coast and trans-Pacific countries originates and ends east of the Rocky Mountains. Doubtless the greater share of this trade will always go overland to and from the Pacific Coast, but some considerable portion will be diverted to the Isthmian route after the canal has been opened. If this diverted trade and tonnage should amount to but 20 per cent. of the total, it would equal about 160,000 tons, —a tonnage equal nearly to our Atlantic Coast vessel movement to and from Hongkong and the Philippines in 1899.

While the Suez Canal will get some of the commerce of eastern Asia and the Philippines with our Atlantic sea board after the Isthmian Canal has been opened, it is believed that this traffic through the Suez may be offset by the amount of the vessel tonnage of our present Pacific Coast import and export trade that would use an American canal. Furthermore, while the Suez route will draw from Manila and points north and east, the Isthmian route will also secure tonnage from the territory lying south and west of Manila. It is thought that these facts warrant

the inclusion of all the Atlantic Coast tonnage to and from China, Japan, Hongkong, and the Philippines in the estimate of the vessel tonnage that would find the use of the canal advantageous. Such an estimate as this can be only approximately accurate, because it is impossible to predict closely the routes which the East Indian and South Asiatic trade will actually follow after the American interoceanic canal shall have completed the water route around the world.

The foregoing discussion has made no reference to the effect which the canal will have in diverting from its present rail and water routes a portion of the commerce now carried on, by way of our Pacific Coast ports, between the eastern half of the United States and Australia, Hawaii, and the rest of Oceania. There are excellent steamship connections between the west coast of the United States and Canada, Hawaii, and Australia; and the traffic and travel of the Eastern United States to and from those countries is in part conducted through Pacific Coast gateways. The Isthmian Canal and the steamship connections by way of it will undoubtedly affect the present routes for some of the traffic now carried on between our Eastern States and those countries. The entrances and clearances of the vessels trafficking between our Pacific Coast and Australia, Hawaii, and other islands of Oceania amounted to 711,643 tons during the fiscal year 1899; but none of this tonnage is included in the figures here given for the canal traffic.

The present trans-Isthmian traffic is a part of the Atlantic-Pacific trade of both Europe and America. Several lines of steamers run north from Panama on the west coast, two lines run south, and the business of those steamers would become canal traffic. More than a million tons of shipping enter the port of Colon each year, but that tonnage would not be a fair index of the amount that

would go through the canal. Colon is a port of call for nearly all the lines of steamships connecting the Gulf, West Indian, and Caribbean waters with the United States and with all the leading European countries. A call at Colon is but an incident in the voyage of the steamers trafficking in the Gulf and Caribbean, but the situation at Panama is different. The geographical location of that city is such that a large part of the steamers from the north or south make Panama the beginning or end of their voyages. Before the year 1899 the lines from the south did not go north of Panama, and none from the north went south of Panama. Since then the lines from the south have extended their route beyond Panama, and that city has now become a port of call as well as a terminal point. If, however, the year 1898 be taken, the tonnage of Panama may be considered as indicative of the tonnage which the trans-Isthmian trade of that time would have caused to use the canal.

During the year 1898, 149 steamers, with an aggregate tonnage of 336,998 tons, entered this port. Whether both the entrances and clearances at Panama should be included in computing the canal tonnage which the commerce at Panama would have contributed to the traffic of an Isthmian waterway in 1898, or whether only the entrances should be counted, constitutes an interesting question in statistics. The clearances were practically identical with the entrances; and, if they were included, the above total would be doubled. But, inasmuch as the total tonnage of cargo freight, northbound and southbound, handled by the Panama railroad in 1898 was only 268,156 tons, it was thought best to count only the entrances at Panama, 336,998 tons, in arriving at the total available canal traffic.

The coasting trade between the two seaboards of the United States carried on by way of Cape Horn or the Straits of Magellan is the only additional tonnage item

requiring examination. The Horn route has been followed since the days of '49; and, while it will probably be deserted after the completion of the canal, it or the Straits of Magellan will be increasingly used until that time. Until 1898 this traffic was handled mainly by sailing vessels, but the line of seven new steamers recently installed in this trade will largely displace the sailing vessels that have had a practical monopoly of the traffic for a half-century. Owing to the large annual fluctuations to which this trade has been subject, an average of Pacific entrances from Atlantic ports and Atlantic entrances from Pacific ports during the past ten years was taken. These averages combined give a total of 109,312 tons per year. The Atlantic entrances averaged 26,323, and those of the Pacific 82,989, showing that Europe is the selling market of the Pacific States, and our Atlantic States are the buying market. Two-thirds of the vessels sailing to our west coast from our Atlantic seaboard clear from our west coast to Europe, cross thence to our Atlantic ports to load for the Pacific slope.

The entrance and clearance totals for the various categories of commerce studied in the preceding pages are summarized in the following table:—

SUMMARY OF ENTRANCES AND CLEARANCES, COMMERCE OF EUROPE WITH PACIFIC AMERICA AND COMMERCE OF EASTERN SEABOARD OF THE UNITED STATES WITH PACIFIC COUNTRIES, 1899.

Europe with	
Western South America	1,771,858
Western Central America and Mexico	140,000
Pacific Coast of United States, British Columbia, and Hawaii	642,180
Eastern Seaboard of United States with	
Western South America and Hawaii	166,364
Pacific Coast of the United States	109,312
Trans-Pacific Countries	908,140
Panama Traffic (1898)	336,998
Total	4,074,852

The total of the above summary, 4,074,852 tons net register, comprises the vessel tonnage of the trade of Europe with Pacific America and of our Atlantic seaboard with Pacific countries. Every possible effort was made to analyze, verify, and correct the statistical data consulted. It was thought better to err, if at all, on the side of understatement.

Attention was called above to the abnormally small export of grain from our Pacific Coast during the year 1899. If the grain exports of the normal year 1898 were substituted for those of 1899, the above vessel tonnage total would need to be increased over 400,000 tons. The grain exports of 1898 exceeded those of 1899 by 612,874 cargo tons; and this, according to the ratio of cargo tonnage to net register tonnage for the Pacific Coast exports as a whole, would be equivalent to 408,723 vessel tons.

This discussion of vessel tonnage has not considered the commerce of Europe with the western half of the Pacific Ocean, a part of which, it is believed, for reasons to be stated later, will make use of the American canal instead of the Suez or Cape of Good Hope routes. In stating the entire amount of vessel tonnage that was available for the use of the canal in 1899, some share of the European commerce now using the Suez or rounding the Cape of Good Hope should be included.

The Traffic Investigation by the New Panama Canal Company.

The New Panama Canal Company divided that part of the world's commerce capable of being affected by the proposed canal into the four groups that had been adopted in 1890 by the *Commission d'Études* appointed by the receiver of the *Compagnie Universelle du Canal Interocéanique*. These four groups were: (1) the commerce

between Europe and the Pacific Coast of the American continents; (2) the commerce between Europe and the Far East,—*i.e.*, China, Japan, Australasia, and Oceania, and the French and Dutch East Indies; (3) the commerce between the Atlantic and Pacific Coasts of America; and (4) the commerce between the Atlantic coast of America and the Eastern countries included in Group 2.

Briefly stated, the plan adopted in 1894 by the New Panama Canal Company to determine what part of the world's present ocean tonnage would make use of an American interoceanic canal was to record and follow the movements of all vessels engaged in the commerce being carried on between the Atlantic and Pacific Oceans. This record of vessel movements was taken from Lloyd's two publications, the *Daily Shipping and Mercantile Gazette* and the *Weekly Shipping Index*, where the Canal Company was able to secure information concerning the arrivals, departures, and whereabouts of all ocean vessels,—about 12,500 in number, as their records subsequently showed.

During the years 1895 and 1896 the plan followed in making up the record was to go through each issue of Lloyd's daily and weekly publications, and place against each vessel, whose route was such as to bring it within one of the four groups of commerce just mentioned, a check indicating to which group the ship was to be accredited. Lists of the vessels thus checked were arranged alphabetically, showing for each of the four classes and for sailing vessels and steamers separately the facts regarding each ship that were given in Lloyd's *Gazette* and *Index*. These eight alphabetical lists—four for steamers and four for sailing vessels—were then turned over to draftsmen, who charted the movements of the vessels named in the eight lists by using sheets of paper which had the names of the ships in a column at the left, and which were divided

into perpendicular columns headed with the names of the twelve months and with the weeks of the year by number from one to fifty-two.

Experience showed that the plan of checking off and copying from Lloyd's lists the vessels according to groups was somewhat defective, because on the charts some vessels would disappear from one group and appear in another in such a way as not to indicate what the intermediate movements of the vessel had been. It also happened that some vessels disappeared from the record after they had touched at a Pacific port, and that other ships appeared on the record as clearing from a Pacific port without there being any record regarding their previous voyages. To obviate this defect, it was decided at the beginning of 1897 to discontinue checking the names of vessels in the *Gazette* and *Index* and preparing lists of the ships thus checked, and instead of doing this work to make a card catalogue (*affiches*) of every ship named in the Lloyd publications. In this catalogue each ship had its card; and on this card all desired information regarding the vessel was entered, and a record kept of the movements of the ship. The graphic charts of the voyages of the vessels were prepared from these cards.

During the year 1897 the Canal Company further improved its methods of conducting the traffic investigation. From Lloyd's *Shipping and Mercantile Gazette* tables were prepared showing for each Pacific port, separately for steamers and sailing vessels and classified according to the four groups of commerce, the name, flag, tonnage, etc., of all the vessels entered and cleared. These tables gave full information regarding the steam and sail commerce of each Pacific port.

At the close of the year 1898 the traffic of the year 1888 was studied according to the methods that had been de-

veloped, and tables were made comparing the years 1888 and 1898 to show what development had taken place during the decade in the commerce being investigated. The following table abbreviated from one prepared by the New Panama Canal Company shows the steam and sail tonnage of each of the four groups of commerce for the calendar years 1888, 1898, and 1899:—

TONNAGE OF VESSELS ENGAGED IN TRADE BETWEEN THE ATLANTIC AND PACIFIC OCEANS 1888, 1898, 1899.

		Group 1. Europe with Pacific America.	Group 2. Europe with the Orient.	Group 3. Between Atlantic and Pacific America.	Group 4. Atlantic America with Orient.	Total for the Year.
1888	Steam	346,015	2,396,105	4,716	78,994	2,825,830
	Sail	1,744,661	1,659,759	217,597	681,877	4,303,894
Total . .		2,090,676	4,055,864	222,313	760,871	7,129,724
1898	Steam	648,568	3,669,091	91,082	441,246	4,849,987
	Sail	1,680,573	948,222	148,204	835,682	3,612,681
Total . .		2,329,141	4,617,313	239,286	1,276,928	8,462,668
1899	Steam	570,997	4,059,392	94,319	699,913	5,424,621
	Sail	1,804,074	1,053,862	107,830	571,444	3,537,210
Total . .		2,375,071	5,113,254	202,149	1,271,357	8,961,831

The commerce included in Groups 1, 3, and 4 of the above table is considered as certainly tributary to the proposed American canal. The commerce of Europe with Eastern countries, Group 2, will, for the greater part, make use of the Suez route; but a portion of the traffic will find the American waterway more advantageous. What share of the total for Group 2 may properly be credited to the westerly canal route must be a matter of estimate. A careful review of the existing trade routes, and

a consideration of the forces that will affect the ocean routes after the American canal has been opened, lead to the conclusion that a portion of Europe's exports to the western half of the Pacific Ocean—that is, to Japan, Australia, and Oceania—will be sent through the American canal.

The volume of traffic to Europe from the East being larger than that outbound from Europe, vessels are obliged to sail both for the eastern part of the United States and for Eastern countries lightly loaded, and sometimes in ballast. Our exports from Atlantic ports to Australia, Oceania, and the Orient are in part carried by ships that cross the Atlantic in ballast. When the American canal has become available, vessels will probably not infrequently take on a partial cargo in Europe for countries in the western half of the Pacific, and also take freight for the United States, the West Indies, Central America, or Mexico; that is, vessels finding difficulty in securing cargoes outbound from Europe will sometimes find it advantageous to proceed to the East by way of America, for the purpose of discharging such European-American cargo as may be secured, and loading at one or more American ports a full cargo for the Pacific port or ports of its destination. In addition to permitting vessels in Europe to unite the light outbound cargoes for the East and for the United States and enabling them to secure full cargoes in America for the East, the westerly route by way of the American canal will have the advantage of cheaper coal, and will probably impose lower canal tolls upon the shipping than will be exacted by the Suez Canal. The Suez Canal is, and doubtless will remain, a highway managed by a corporation, whereas the American waterway under consideration is to be owned and operated by the government.

The distance from Liverpool to Sydney, Australia, by

way of the Nicaragua Canal and Tahiti will be only 172 miles greater than via the Suez, Colombo, Adelaide, and Melbourne; and this small disadvantage of the westerly course will be partially, if not quite, offset by two facts favoring the American canal route. From Liverpool via the Cape of Good Hope, Adelaide, and Melbourne, Sydney is 772 miles farther than by way of a Nicaragua canal and Tahiti. The use of the westerly route will enable vessels engaged in the European-Australian trade to avoid the excessive heat of the Gulf of Aden and the Red Sea and the storms of the tempestuous Indian Ocean. The American route also will be favored by the fact that a vessel on its way between Liverpool and the Isthmian Canal will have to go but 323 miles out of its course to call at New York, whence outbound cargoes are practically always obtainable. With the advantages of cheaper coal, a cooler passage in the tropics, quieter seas, and the attractive force of America's heavy tonnage, the American Isthmian route will be used instead of the course through the Suez Canal by some of the vessels departing from Europe for Australia or other regions on that side of the Pacific Ocean.

Vessels proceeding from Europe by way of American ports and the Isthmian Canal to Oceania and the East will have the choice of returning to Europe either by way of the Suez or by way of the American route. By whatever route the European vessels reach the Oriental and other countries of the western Pacific, the route by which they return to Europe will be determined by the relative opportunities for obtaining cargo by way of the Suez and American routes respectively. The reasons for believing that a portion of Europe's imports from the western half of the Pacific will come by way of the American route are stronger than the reasons just cited regarding the use

of the American canal for the European export trade. A vessel finding itself in the East Indies, Japan, China, or Australia, may either take on cargo for Europe and for intermediate ports along the Suez route or it may load with such cargo as may be available for Europe and American countries, and proceed—in most cases but partially loaded—across the Pacific to the western coast of the United States, where a great abundance of cargoes destined for Europe may be obtained, or the ship may go to Central America and West Indian ports, where a fair amount of freight for Europe will usually be available, or the vessel may proceed to Chile or some other west South American country, where there is always a heavy amount of outbound traffic. Besides being certain of securing freight from South America or North America for Europe, a vessel returning from the Orient by the American canal will also have the advantage above referred to of being able to secure coal more cheaply than it can be obtained along the Suez line.

It would seem probable upon *a priori* grounds that vessels leaving Europe, whether by way of the Suez or by way of the American canal, will frequently find the return trip via America more profitable than by the route in the opposite direction. This general proposition, moreover, seems to accord with the evidence regarding the present round-the-world movement of vessels. The entrance and clearance statistics of the vessels engaged in the foreign trade of the west coast of North and South America indicate that a large number of vessels now going out from Europe toward the East return from the west.

Tonnage of Available Canal Traffic, 1899.

The records kept by the Panama Company show that during the calendar year 1899 the commerce of Groups

1, 3, and 4 might have contributed 3,848,577 tons net register to the traffic of the Isthmian Canal. This sum does not include any vessel tonnage for the commerce crossing the Isthmus of Panama. The addition of that tonnage, 336,998, raises the total to 4,185,575. The entrances and clearances for the commerce of the eastern seaboard of the United States with Pacific America and with Australia, Oceania, the Philippines, Japan, China, and Siberia, and the vessel movements between the western coasts of the American continents and the North Atlantic American and European ports, were found to amount to 4,074,852 vessel tons net register, including the 336,998 tons for the commerce crossing the Isthmus of Panama.

In addition to this tonnage, which comprises only traffic originating or terminating in America, there should be included most of the commerce of Europe with New Zealand and the other islands of the Pacific east of Australia. New Zealand will be 1,503 miles nearer Liverpool by the Nicaragua Canal than via the Suez route, and 2,407 miles nearer than by way of Good Hope. The distances to Liverpool from the most important groups of South Pacific Islands north of New Zealand will be from 500 to 5,500 miles less via the Isthmian Canal than by way of Suez. The entrances and clearances of New Zealand's trade with north-western Europe—France and countries farther north—amounted to 481,178 tons net register in 1899, and the commerce of that part of Europe with the other islands of the South Pacific east of Australia to 181,743 tons. Of this total traffic of 662,921 tons, not less than 500,000 might have advantageously used an Isthmian Canal, and this amount should be added to the tonnage of the canal traffic originating or terminating in America. This makes the total obtained by the Commission's investigation of the tonnage that might

have used an Isthmian Canal in 1899 4,574,852 tons net register; and the total obtained by adopting the New Panama Canal Company's figures for the traffic originating or terminating in America, 4,685,575 tons.

The above totals for the tonnage that might have used an Isthmian Canal in 1899 do not include any of Europe's trade with Australia and Japan, a part of which would have used an Isthmian waterway. The distances from Great Britain to Sydney and Yokohama by the Suez and Isthmian Canal routes are approximately equal, and vessels going by America in either direction *en route* between Europe and Japan or Australia will pass regions from which there is a heavy export tonnage. If it be assumed that only 10 per cent. of the vessel tonnage of the Australian trade with the ports of North-western Europe and only 5 per cent. of the tonnage of the Japanese commerce with those ports would have taken an American canal route, the totals for 1899 should be increased 316,223 tons, and be raised from 4,574,852 to 4,891,075 tons, and from 4,685,575 to 5,001,798 tons, or to approximately 5,000,000 tons.

Comparison of the Results of the Three Traffic Investigations.

The three investigations outlined above were made not only without reference to each other, but also according to entirely different methods. Two of the investigations were made by the Isthmian Canal Commission, and the other under the direction of the New Panama Canal Company. It is not often in statistical and economic investigations that such an opportunity for checking up results is afforded as is possible in the present instance. *The freight tonnage* of the trade between Europe and Western America and the tonnage going by water between

the eastern seaboard of the United States and Pacific countries amounted to 6,703,608 tons in 1899. The total entrances and clearances of the vessels engaged in this trade at that time equalled 3,965,540* tons net register. This would make the average ratio of cargo tonnage to net register tonnage 1.69. The records of vessel movements kept by the New Panama Canal Company show a tonnage of 3,646,428 net register tons during the calendar year 1899 for the commerce of Groups 1 and 4, which correspond in general, although not exactly, with the trade included in the above cargo tonnage total. The ratio of cargo tonnage to the vessel tonnage of Groups 1 and 4 is 1.83. This is a somewhat higher ratio than that between the cargo tonnage and vessel tonnage of entrances and clearances.

The tables prepared by the New Panama Canal Company do not include the vessel tonnage of the trade at Panama. Their method of recording the movements of vessels passing from ocean to ocean and totalizing those movements naturally would not take account of the traffic at Panama. In the tonnage total of entrances and clearances obtained by the Isthmian Canal Commission the Panama traffic was reckoned to be 336,998 tons net register. If this sum be added to the vessel tonnage total of Groups 1, 3, and 4, and the cargo tonnage be divided by this larger figure, the ratio becomes 1.60.

The "dead-weight" cargo carrying capacity of American schooners of 500 to 2,000 tons net register averages about 66 per cent. more than the net register; but this ratio varies greatly with different vessels. The ordinary modern freight steamer, when fully loaded, will carry about

* This is 4,074,852 tons minus 109,312 tons, the coasting trade between our two seaboards. The 6,703,608 tons of cargo do not include any of our coasting trade: hence the vessel tonnage total is reduced before comparison is made with the total cargo tonnage.

2.25 tons of cargo for each ton net register. Vessels are not fully loaded on all voyages. Some are obliged to make trips in ballast in search of cargo, and many more are but partially laden on the outbound or return voyage of a round trip. There are very few ports of the world where the volume of exports and imports are equal. Great Britain buys a much larger bulk of commodities than she sends out. The opposite is true of the United States and Western South America. Consequently, the average cargoes of ocean vessels engaged in international trade are much less than their maximum carrying capacity.

The ratios of cargo to net register tonnage, obtained above by dividing the total available canal freight tonnage by the corresponding net vessel tonnage, are about what might be expected on *a priori* grounds. The fact that these ratios are apparently correct is not a definite proof of the accuracy of the tonnage totals compared, but it is corroborative evidence. If any one of these three totals compared were grossly in error, there could not be such close correspondence in the ratios.

The total of *entrances and clearances* in the trade of the year 1899 between Europe and Western America, and between the Eastern United States and Pacific countries, 4,074,852 tons, is somewhat less than the New Panama Canal Company's total of vessels engaged in this commerce, if the traffic at Panama be added to their figure for groups 1, 3, and 4. The tonnage of these three groups during the calendar year 1899 was 3,848,577; and this, plus the entrances at Panama in 1898 336,998 tons (the vessel tonnage adopted for the entire Panama traffic), amounts to 4,185,575 tons.

A more detailed comparison of the tonnage figures of tables prepared by the Commission with those made by the New Panama Canal Company would show that the

totals for the two coasts of America are not very different. It is uncertain whether the trade of Hawaii is included in Group 3 of the Panama Company's tonnage table. If it is, the Commission's figures are larger: if Hawaii is not comprised in Group 3, its inclusion there would make the Panama Company's figures greater. For the trade between Europe and the west coast of the Americas the Commission's total is somewhat larger than the Panama Company's, 178,967 tons, if the trade of Hawaii be included in the Commission's figures, and 153,935 tons, if omitted. If Group 3 does not include the Hawaiian commerce, the vessel tonnage of that commerce should be subtracted from the figures of "entrances and clearances" before the comparison is made. Concerning this difference of 154,000 or 179,000 tons between totals approximating two and a half millions, it should be said that the periods covered by the two totals are not identical, and that the two methods of determining vessel movements could hardly be expected to yield exactly the same results. Vessels do not always make the port they clear for. Accidents may prevent or telegraphic orders from the owner or charterer may change the course of the vessel.

It is in the vessel tonnage of the commerce between the Eastern American seaboard and the countries of the western part of the Pacific (*i.e.*, the Far East) that the largest difference exists between figures of the Panama Company and the Commission. The total of Group 4 in the calendar year 1899 was 1,271,357, while the total of entrances and clearances accepted for the fiscal year ending June 30, 1899, by the Commission for the trade between the eastern seaboard of the United States and the western Pacific countries was 908,140 tons net register. This amount, it will be recalled, is twice the tonnage of vessels clearing direct from the Atlantic seaboard to Japan,

Siberia, China, the Philippines, and Australasia. Group 4 of the French tables includes some commerce (that of Singapore and the Dutch East Indies) not comprised in the Commission's figures for the trade between our eastern seaboard and trans-Pacific countries. Moreover, a complete statement of the vessel tonnage of this commerce cannot be made from our statistics of entrances and clearances, because a share not only of the commodity traffic, but also of the vessel tonnage of this commerce, is credited in our statistical records to our trade with Europe. It is quite possible that the vessel tonnage engaged in the commerce between our eastern seaboard and the countries of the western Pacific is somewhat greater than 908,140 tons net register. Group 4 applies to the commerce between the entire east coast of the American continent and the countries of the western Pacific; but there can be but very little vessel movement between the Far East and any Atlantic American countries other than the United States.

The only other tonnage item requiring mention in this comparison is that of the commerce at the city of Panama referred to above. The total of entrances and clearances, as determined by the Commission, credit that traffic with 336,998 vessel tons net register, whereas the methods in accordance with which the calculations of the New Panama Canal Company were made were such as not to include that tonnage.

The results of the three traffic investigations are such as to affirm the essential accuracy of each. The ratio between cargo tonnage and vessel tonnage apparently accords with the facts of ocean commerce. In view of the complexity of the statistical problem and the difference in the methods of dealing with the problem and the slight difference in periods covered, the vessel tonnage totals

obtained by the Commission's investigation of entrances and clearances and the New Panama Company's record of vessel movements correspond as closely as could be expected.

Growth of Traffic, 1899–1914.

The factors affecting the growth of commerce are so numerous and so interrelated that it is difficult to estimate the growth in traffic that will take place during the decade or more that must intervene before an Isthmian Canal can be ready for use. The only basis of calculation is the increase of the past under the conditions of production and transportation and the requirements of international trade that then prevailed. All of these conditions are constantly changing, and thereby affecting the volume and nature of the commodities exchanged and the routes followed by the commerce of the world.

Of one thing, however, there can hardly be any uncertainty. Commercial progress during the near future will be fully as rapid as it has been the past ten or twenty years. The demands of consumers are everywhere expanding; and sections like Africa and Eastern Asia, that have thus far had but slight contact with the rest of the world, are being rapidly brought within the sphere of international commerce. The costs of transportation, both inland and maritime, continue to decline with the improvement of mechanical appliances and the accumulation of capital seeking profitable investment. Nations and individuals are devoting themselves with energy to the extension of trade and commerce. This is particularly true of the people and government of the United States.

Such being the case, the probable tonnage of the traffic that will be available for an Isthmian Canal at the time

of its completion will doubtless be conservatively estimated by predicating a continuation of the rate of increase that has prevailed during the past decade. In all probability the growth will be more rapid in the future: it surely will not be slower.

The statistics of the New Panama Canal Company found that the tonnage of the vessels trafficking between the two coasts of America, between the Eastern United States and the Orient, between Europe and Pacific America,—*i.e.*, the available canal tonnage originating or terminating in America,—increased from 3,073,860 tons net register in 1886 to 3,845,355 tons in 1898,—a gain of 25.1 per cent. To determine whether this rate of increase per decade was one whose use would result in a conservative estimate of the probable available canal traffic in 1914, a study was made of the progress in the vessel tonnage and value of the international trade of several typical regions. It was found that the value of the trade between the Atlantic coast of the United States and Pacific South America increased 26.8 per cent. during the decade 1889-99. For the commerce between our Atlantic seaboard and Pacific countries other than South America the growth was 49.7 per cent. The trade of the United States with Australasia more than doubled during the decade ending in 1900. The vessel movements between Europe and Chile increased 33.3 per cent. during the ten years ending in 1898. European entrances from the west coast of South America gained 36.5 per cent. While the trade between the Pacific Coast of the United States and trans-Pacific countries will not use the canal, the rate at which that commerce is increasing may well be considered in this connection. The total entrances and clearances of the trade between our Pacific Coast and Hawaii, Siberia, Japan, China, and Hongkong gained 191 per cent. from 1889 to 1899.

In view of these facts it would seem that an increase of 25.1 per cent. per decade up to the time of the opening of the canal may be very safely and conservatively predicated concerning the traffic that might have advantageously used the waterway in 1899. Predictions concerning the coming ten or fifteen years must necessarily be based upon the experience of the past; and, unless the decade upon which the calculations here presented as to the future are made to rest was one of abnormally rapid or slow commercial progress, it may properly be made the basis. Taken as a whole, the decade preceding 1899 was probably one during which the world made normal industrial and commercial progress. In the United States the earlier years and the last year of the period were characterized by great business activity, but during fully a third of the decade a business depression of unusual severity prevailed. The years from 1893 to 1897 were more trying ones in this country than they were in Europe, but business was dull rather than active in Europe during that time. Consequently, it is probable that estimates based upon this decade will not lead to an exaggeration of the facts.

The Panama Canal Company's figures for the vessel movements of the commerce originating or terminating in America, increased by the present trans-Isthmian traffic, and 816,223 tons of Europe's trade with Oceania, Australia, and Japan, show that the available canal traffic for the calendar year 1899 was 5,001,798 tons net register. An increase of 25.1 per cent. during the decade ending in 1909 would raise the amount to 6,257,249 tons; and the same rate of growth would bring the total to 6,998,733 —or, in round numbers, 7,000,000—tons in 1914.

If the tonnage of available canal traffic in 1899, as determined by the Isthmian Canal Commission's study of entrances and clearances, be made the basis of estimate,

and the increase of 25.1 per cent. per decade be assumed, the figures for 1909 will be 6,118,735 net register tons, and for 1914 6,843,805 tons.

In the foregoing estimates of tonnage the figures refer to the available canal traffic. It is not probable that all of the commerce included in the above totals will at once abandon the routes at present followed, and immediately make use of the Isthmian waterway. It will take some time to readjust trade with reference to the new conditions which the canal will establish, and possibly two years may be required for merchants and carriers to adapt themselves to all the changes in the routes and methods of international trade that the use of the canal will necessitate. The totals to which the three investigations of available canal tonnage have led may be designated as the measure of all the commerce that would have used the canal in 1899, had the commerce of our own and foreign countries been adjusted to the condition of trade which the canal would have established. There is no tonnage included in the totals which might not advantageously use the canal, except during the temporary period of transition from the existing conditions governing international trade and controlling the commerce between our eastern and western seaboards, to those conditions which will exist after the Isthmian route has been opened.

Estimate of Growth of Traffic during First Decade of the Use of the Canal.

The new interoceanic communication will so greatly modify the routes of commerce, and the conditions controlling the progress of the industries and commerce of many sections of the world, that the problem of estimating the increase that may be expected to take place in the

tonnage using the canal during the first decade following the opening of the waterway is a different one from that of predicting the growth of available traffic up to the time of the completion of the canal. The rate of increase will be much more rapid after the canal has been put into service and its economic effects have begun to be realized.

While it is not to be expected that the traffic of the Isthmian waterway, during the early years of its operation, will increase so rapidly as did the tonnage passing the Suez Canal, the best basis for estimating the probable increase that will occur in the tonnage of the American Isthmian waterway is the rate of growth that the traffic of the Suez Canal has had. The increase in the traffic of the Suez Canal is well shown by grouping the figures into five-year periods, and comparing the totals of these periods. This is done in the following table:—

INCREASE IN THE NUMBER OF VESSELS AND TONNAGE OF THE SUEZ CANAL BY QUINQUENNIAL PERIODS.

Years.	Number of Vessels.	Net Tonnage.	Per cent. Increase.	Percentage which the tonnage of each five-year period is of the tonnage of 1875–1879.
1870–74	4,770	5,358,237		
1875–79	7,684	10,995,214	105	
1880–84	14,542	23,916,374	117	217
1885–89	16,726	31,430,454	31	286
1890–94	17,848	39,899,143	27	363
1895–99	16,939	44,042,274	10	401

If the first five-year period were made the basis of comparison, the rate of increase would be so great as to exaggerate the progress which the traffic made during the subsequent quinquennial periods. The Suez Canal could be used advantageously only by steamers, and in 1870 the number of steamers available for the commerce between

Europe and the East Indies was limited. For some years the greater part of the commerce continued to go in sailing vessels around the Cape of Good Hope. After the canal had been in use a few years, however, steamers were to a large extent substituted for the sailing vessels, and the Suez route for the Cape route for the greater part of the business. It will be seen that the traffic of the five years 1880–85 was 217 per cent. that of the previous quinquennial period. The tonnage of 1885–89 was 286 per cent. of the period from 1875 to 1879; the tonnage of 1890 to 1894 was 363 per cent.; and that of 1895 to 1899, 401 per cent. of the traffic of the five years 1875 to 1879. During the last quinquennial period of the twenty-five years from 1875 to 1899 the traffic of the Suez Canal was four times what it was during the first five years. Had the traffic of the years 1870–74 been made the basis of comparison, the above percentages would have been very much larger.

Omitting the first two years when the traffic was comparatively light because but few steamships were available for the trade between Europe and the East, and making 1872 the basis of comparison, it will be seen that the traffic grew from 1,160,743 net tons in 1872 to 5,074,809 net tons in 1882,—a gain of 337 per cent. The tonnage of 1875 had increased 215 per cent. by 1885. The traffic of 1890 was 125 per cent. greater than that of 1880. Since 1890 the absolute gain in the tonnage figures has been large, although the percentage of increase is less than it formerly was. The gain of 46 per cent. from 1889 to 1899 represents an increase of 4,210,247 tons gross register and 3,112,443 tons net.

Should the rate of increase in the tonnage of the Isthmian Canal during the first ten years be half that of the Suez during the second decade of its use, the rate would be 62½ per cent. In view of the much larger rate shown

by the Suez Canal, and in view of the conditions that will favor commercial progress at the time of and subsequent to the opening of the American canal, 62½ per cent. is believed to be a conservative estimate.

A decennial increase of 62½ per cent. in the estimated traffic available for the canal in 1914, as determined by the figures obtained by using the tables prepared by the New Panama Canal Company, would give a tonnage of 11,372,941 net vessel tons in 1924. A 62½ per cent. increase in the estimated vessel tonnage total of 1914 reached by the Commission's study of entrances and clearances—6,843,805—would amount to 11,121,183. These two estimates for 1924 average about 11,250,000 tons.

For reasons stated above the entire amount of the available canal tonnage can hardly be expected to use the new route during the first year or two of the operation of the waterway,—the period required for the readjustment of commercial arrangements. This adjustment will, however, not be delayed by a scarcity of steamers, and will be quickly made. After two years the full amount of the available canal tonnage—the available tonnage of 1916, not of 1914—will in all probability be passing the canal.

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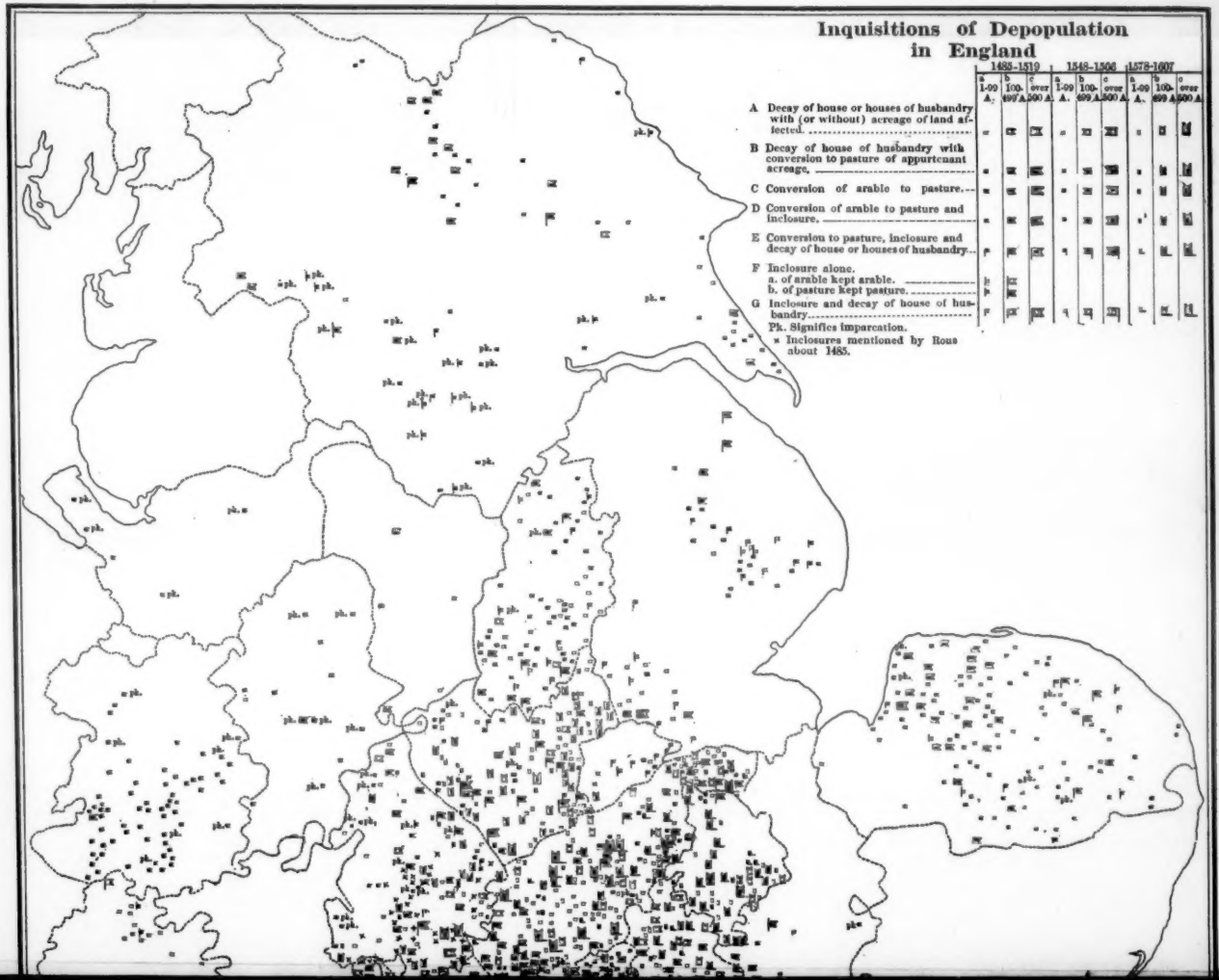
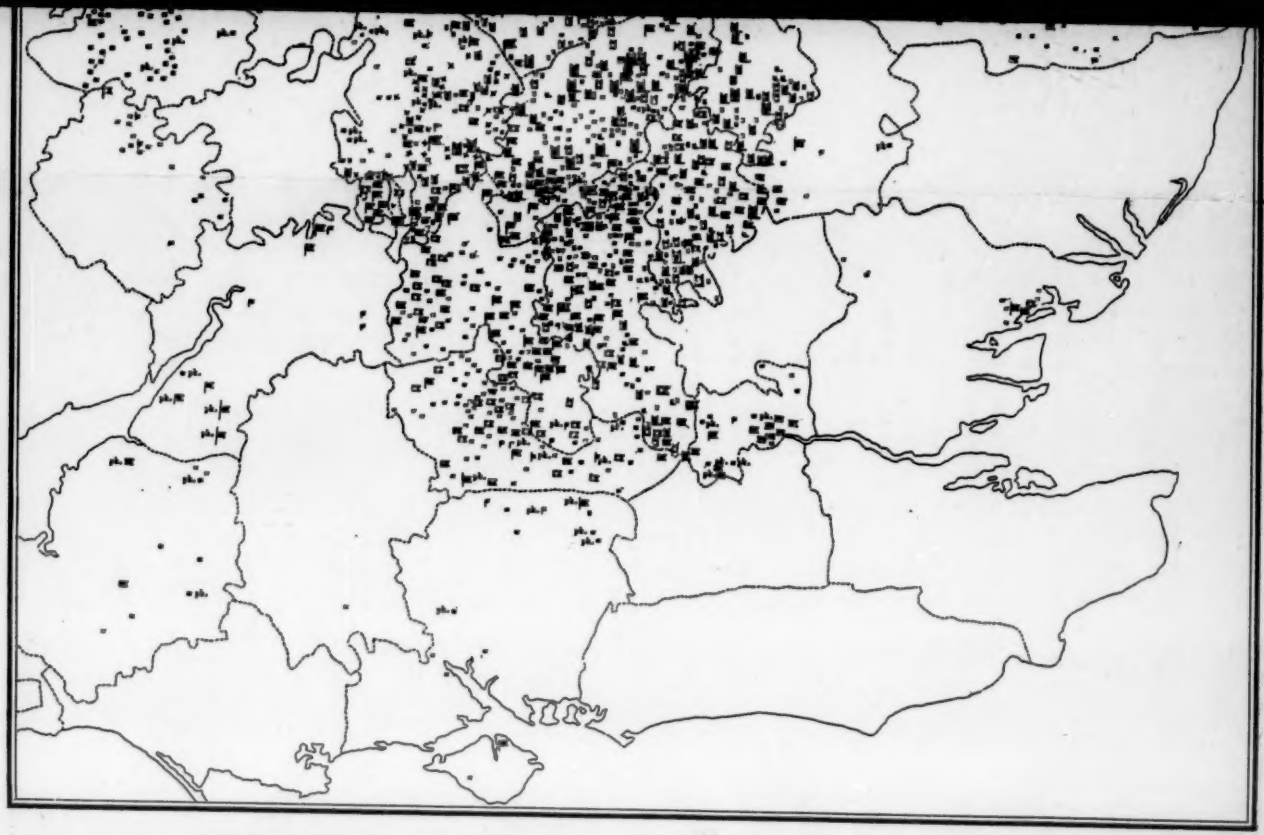
INCLOSURES IN ENGLAND IN THE SIXTEENTH CENTURY.

TEN years ago Professor Ashley gave us with his valuable chapter on the Agrarian Revolution the first map of the inclosures of the fifteenth and sixteenth centuries. This pioneer attempt at a graphical representation of one of the most interesting and important movements in English social history was based on the scanty local references in contemporary literature and on the agricultural surveys of the eighteenth century. From the inadequate evidence then at hand this map necessarily left much to be desired. In the interval, however, new and fuller sources have been opened and in part made accessible by publication. And, though this fresh evidence can scarcely be termed "adequate," nevertheless, with its more precise data, it permits of a new attack upon the problem of the extent of the inclosure movement in England during this period. A new map, in some respects materially correcting the former and suggesting a somewhat different estimate as to the magnitude of the agrarian change, may now be constructed with the materials furnished by contemporary official investigations.

The outline map herewith presented bases itself solely, therefore, upon the information gathered by government commissioners sent out under the influence mainly of successive waves of popular discontent. They collected the presentments of local juries as to the depopulation and decline of tillage caused by the inclosure of the open fields of the old agricultural system and by the conversion from arable to pasture of the land thus hedged in. These investigations or inquisitions were made in the years


Inquisitions of Depopulation in England
1485-1519
1548-1606
1578-1607
a 1-99 A.
b 100-499 A.
c over 500 A.
A Decay of house or houses of husbandry with (or without) acreage of land affected.
B Decay of house of husbandry with conversion to pasture of appurtenant acreage.
C Conversion of arable to pasture.
D Conversion of arable to pasture and inclosure.
E Conversion to pasture, inclosure and decay of house or houses of husbandry.
F Inclosure alone.
a. of arable kept arable.
b. of pasture kept pasture.
G Inclosure and decay of house of husbandry.
Pk. Signifies imparcation.
x Inclosures mentioned by Rous about 1485.



1517–19, 1548, 1566, and 1607.[1] The inquiries of 1548 and 1566 were apparently not pushed very far. At any rate we now possess for that of 1548 but a few meagre notes from Warwickshire and Cambridgeshire,[2] while the inquisition of 1566, with trifling data from Leicestershire, gives only enough from Buckinghamshire to indicate the steady progress of the movement for this region in the mid-century.[3] But the two inquisitions of 1517–19 and of 1607, each covering a retrospective period of some thirty years, furnish a considerable amount of serviceable material. Of the first of these, the larger and more important part, edited by Mr. Leadam, has been published by the Royal Historical Society; the second still awaits publication. Though some part of the work of these commissioners is now, through time and neglect, either lost or indecipherable, there is reason to believe that the lacunæ are inconsiderable, at any rate cannot materially affect the general conclusions that may be drawn from the map and the statistical tabulations founded upon these documents. There are preserved either in abstract or in full the presentments for twenty-three counties returned to Chancery by the commissioners of 1517–19;[4] and, though the extant returns of 1607, now in the Record Office in London, give evidence from but six counties, these six

[1] I do not include the commission of 1636. The Public Record Office in London contains the accounts of compositions made by inclosers as a result of this commission, but the returns upon which these compositions were based has not yet been found.

[2] The Warwickshire entries are printed from Dugdale's MSS. in Leadam's *Domesday of Inclosures*, 1897, vol. ii. pp. 656, 666. The Cambridge presentments (Cooper, C. H., *Annals of Cambridge*, II. 38), are probably to be referred to this commission.

[3] I have also entered upon the map the few items concerning Middlesex preserved in a jury presentment of 1556. *Hist. MSS. Com.*, xv. (ii.) 258 ff.

[4] Mr. Leadam has published the Lansdowne abstracts for ten counties in the *Transactions of the Royal Historical Society*, 1892-94, and the original Chancery returns for nine additional counties in his *Domesday of Inclosures*. Returns for four more counties have since come to light. See my list in *Transactions of the Royal Historical Society*, xiv. 238, n. 2.

are in the Midlands, the centre of the inclosing activity of the period.

The entries in these returns supply normally the names of the offenders responsible for the decay of farm-houses or for the inclosure and conversion to pasture of arable land, the place and the date of such offence, the acreage of the land affected, and other details, such as the number of persons evicted and the number of ploughs laid down, which did not fall strictly within the scope of their inquiry. The intention was to gather the information necessary for prosecution under the Husbandry Act of 1490 (4 Henry VII. c. 19) and the subsequent similar statutes; and while at times, notably in the case of large and heinous inclosures, more detail is given than the law required, as a rule less is given than the modern student of Tudor social history would desire, sometimes, it must be added, too little for the legal purposes of statutes which even contemporary lawyers found obscure and labyrinthine. Recourse must be had, therefore, to interpretation and inference. A considerable number of the entries, for instance, present simply the decay of a house of husbandry possessing twenty or more acres of land,—the specific offence under the Act of 1490,—no mention being made of an inclosure or of conversion to pasture. But there can be little doubt, both from the words of the statutes, from the evidence of subsequent legal proceedings initiated under these presentments, and from contemporary complaint that this destruction of farm-houses, as a rule, tacitly implied an accompanying inclosure of the farmhold for grazing purposes. It would probably, however, be too sweeping an inference to treat all such entries as cases of inclosure and conversion. A certain limited proportion of the presentments are doubtless to be taken as meaning what they say with no fur-

ther implication, simply that a farm-house has been emptied of its husbandmen, and the land usually held with it has been "severed" from its house,—a word usual in the inquisition of 1607,—and consolidated with other holdings in the unchanged open-fields. But the combined process, the emptying the house of its farming tenants, the consolidation and hedging in severalty of its appurtenant acres, and the laying down of this land to grass, was no doubt the "decay" aimed at by popular outcry and legislative action. Interpretation of the inquisitions in this sense seems, therefore, in the main justifiable. Yet it is not only conceivably possible, but probable, that the different steps in this process were occasionally separated in practice. As has just been remarked, there could be eviction or eviction and decay of the house simply or accompanied by a severalling of open-field strips without inclosure and without conversion, and *vice versa* there could be inclosure or even inclosure and conversion (under a convertible husbandry) without the decay of a husbandman's house. Decay might be associated with conversion to pasture without new inclosure, not only in the old inclosed districts, but, if the returns of 1607 are to be trusted, in the open-field country. In view of these complications it has seemed advisable, in constructing the inclosure map, to summarize results as little as possible, and by the use of a number of distinctive signs, even at the risk of taxing eyesight and patience, to give a full and unbiassed graphical translation of the record. But, in the accompanying table, presenting in abbreviated form some of the statistical results of an analysis of the returns of 1517 and 1607, I have preferred not to burden the page with the minuter distinctions of tabulation. The subjoined figures illustrating the extent of the inclosure movement will be confined, therefore, to the acreage affected in each county, with

its percentage of the total land area of the county, the number of villages or hamlets from which returns are forthcoming, the number of houses of husbandry decayed or turned into cottages with little or no land, and, finally, the number of persons mentioned as displaced by the agricultural change, though, owing to the variable character of the returns in regard to this last item, the figures are of inferior value.

To those acquainted with what has been already published of these inquisitions, it scarcely needs remark that any statistical tabulation of their data must be open to cavil. Historical statistics at best are rarely satisfactory, and the entries which in this instance furnish the raw material are themselves often so vague or deficient that statistical deductions, though made in each individual case with the most cautious objectivity, leave a residuum of misgiving. It is often difficult, for example, to determine whether entries found in the supplementary inquisitions of 1518 are or are not duplicates of those of the returns of 1517. Virgates and carucates must be reduced to acres by some kind of a county average. Texts that are in part illegible or obscurely worded must be elucidated. These are but a few of the many perplexities. But, with all allowance made for deficiencies of text and errors of interpretation, the totals for the first inquisition of 1517 may at any rate be taken as a minimum estimate of the inclosures of the period 1485–1517 and as a fair index of the relative extent of the movement in different sections of England.

The temptation lies near to attempt, by utilizing these partial results as a basis, to form some rough general notion of the whole progress of the agrarian change down to 1607. But, in yielding to it, the rather hazardous nature of the venture must be clearly kept in mind. Three gaps in our table must be filled, the period

County.	Total land area of county.[a] Acres.	Inclosure Inquisition of 1517–19. (1485–1517.)						Inquisition of 1607. (1578–1607.)					
		Acreage affected.	Percentage of total county area.	Number of places.	Houses of Husbandry.		Number of persons displaced.	Acreage affected.	Per cent. of total county area.	Number of places.	Houses of husbandry.		Number of persons displaced.
					Decayed.[b]	Made cottages.					Decayed.	Made cottages.	
I. *Northern.*													
Chester	647,821	65½	0.01	5	—	—	—						
York, W.R.	1,758,775	1,837	0.10	28	18	—	58						
York, N.R.	1,357,666	2,503	0.18	28	30	—	82						
York, E.R.	751,743	1,384	0.18	25	31	—	135						
II. *Western.*													
Salop	856,316	1,859	0.22	71	23	—	356						
Hereford	536,048	1,185	0.22	18	20	2	—						
Gloucester	800,253	3,681½	0.46	20	42	7	211						
III. *Midland.*													
a Stafford	737,944	538	0.07	13	4	—	15						
a Derby	648,133	620	0.10	7	15	3	56						
a Notts	536,595	4,470	0.83	80	71	—	188						
b Warwick	576,195	9,694	1.68	70	189	18	1,018	5,373	0.93	28	62	26	33
b Leicester	530,799	5,780½	1.09	49	136	12	542	12,290½	2.32	70	151	21	120
b Rutland	97,085	531	0.55	15	26	—	—						
b Northampton	636,244	14,081½	2.21	112	345	9	1,405	27,335½	4.30	118	201	157	1,444
c Oxford	478,036	11,831	2.47	107	176	10	720						
c Buckingham	477,307	9,921	2.08	70	160	12	887	7,077½	1.48	56	29	51	86
c Bedford	301,817	4,137	1.37	36	89	—	309	10,004	3.32	69	47	75	259
c Berks	459,403	6,392	1.39	86	116	—	588						
c Middlesex	147,170	2,236½	1.52	18	11	1	123						
d Huntingdon	(233,203)	—	—	—	—	—	—	7,677½	3.29	52	59	87	290
d Cambridge	551,475	1,402	0.25	8	1	—	—						
IV. *Eastern.*													
Lincoln	1,691,911	4,866½	0.29	63	70	—	158						
Norfolk	1,307,058	9,334	0.71	122	70	—	—						
Essex	976,125	1,248	0.31	9	12	—	38						
V. *Southern.*[c]													
Hants	1,048,808	1,035	0.10	17	8	—	42						
Somerset	1,037,231	660	0.06	13	8	—	—						
Total	18,947,958	101,293	0.53	1,090	1,647	74	6,931	69,758	—	393	549	417	2,232

[a] County areas (land only) are as last revised by the Director-general of Ordnance Survey.
[b] Including cottages decayed.
[c] Wiltshire, with only one entry of a house decayed and one ploughland converted to pasture, is here omitted.

of at least thirty years before 1485, the sixty-year span between 1518 and 1577, and the thirty years from 1578 to 1607, in those counties for which we have returns in 1517, but not in 1607. What shall be the conjectural estimate of the rate of the movement's progress during these intervals,—was it equal to that from 1485 to 1517, or was it greater or less? We have, again, in the second place, figures from twenty-four counties. Shall a hypothetical increment be added for possible inclosures in the sixteen English counties not represented in either of the two chief official inquiries? And, if we are mainly to operate, as we must, with the statistical results of the inquisition of 1517, even supposing that we possess practically all the work of the commissioners, can we be at all sure that they did their work thoroughly, that they did not overlook or have concealed from them or even themselves conceal or palliate a considerable number of inclosure cases? Can any reckoning, to ask this third question, be made of a coefficient of error, intentional or otherwise? To the second and third queries, as far as any statistical valuation is concerned, the answer must be a *non possumus*. For the first, and for any merely general answer to the other questions, we are reduced to surmises, to an uncertain balance of probabilities derived from the vague evidence of contemporary literature and legislation or from a few inadequate statistical data. A consideration here in detail of these doubts would take us too far afield; it must suffice to state the conclusions or impressions which have seemed to justify the method adopted.[1]

Regarding the impeccability of the inclosure commissioners, it may be granted at once that, despite Wolsey's

[1] A fuller discussion of the points here raised will be found in a forthcoming issue of Schmoller's *Forschungen*, where I deal at length with the question of the extent of the inclosure movement.

undoubted zeal stimulating their efforts, they likely enough failed to gather in their net all the offenders of the preceding thirty years. We know too well the character of the local juries of the time, the nature of the pressure which the great landholders could exert, to have implicit faith in the full reliability of their presentments. Such pressure, especially in opposition to a Tudor royal commission, would sedulously avoid publicity; direct evidence of tampering with juries would in any specific instance not now be easy to obtain. But some slight evidence has come down to us concerning these very inquisitions, and we are not left to mere suspicion. Furthermore, it is often noticeable that pains were seemingly taken to remove the sting from the entries which pointed to the commissioners as themselves transgressing. But that such entries were made at all, that they were only rendered legally harmless instead of being suppressed outright, has a certain significance. On the whole it may, I think, fairly be doubted that any considerable suppression or perversion of fact was attempted. The allowance for this element of error need not be far-reaching. There exists, however, in any case no sufficient basis for a numerical estimate of this factor in the problem.

The same holds true to some extent of the second doubtful element, the possibility that counties not represented in our list may have contributed some noteworthy quota to the sum total of inclosures, though here we are on somewhat firmer ground. It is probable that in some of these sixteen counties a certain amount of inclosure was going on, but there is little outside evidence of it. The dean of Durham was doubtless indulging in the usual exaggeration of the time when he wrote, in 1597, that in the bishopric of Durham "500 ploughs have de-

cayed in a few years" and "of 8,000 acres lately in tillage now not eightscore are tilled,"[1] but it is evident that at least towards the close of the century the movement, or something very like it, was spreading northward to a region untouched by the official investigations. Closer examination, however, shows that most of these sixteen counties really lay outside the sphere of the inclosure movement of this period. They belonged in large measure to the old inclosed country, where the agricultural system was radically different from that of the open-field districts, a country where inclosures had prevailed from a time long anterior to this movement of the fifteenth and sixteenth centuries. To these old inclosures we must later briefly revert. For the present we have simply to note that they do not enter as a disturbing factor in our estimate with a weight of which we need or can take account.

The third question as to the rate of progress remains. Professor Ashley limits the "precipitate change" for this period to the sixty years between 1470 and 1530. "After about 1530," he says, "the movement somewhat slackened."[2] Dr. Cunningham, on the other hand, speaks of the "rapid progress of enclosures" towards the middle of the century, and gives a modified adhesion to the view widely held that the change of ownership at the dissolution of the monasteries gave a new impetus to the movement.[3] The former of these opinions rests largely upon a misapprehension as to the nature of the old inclosed

[1] *Cal. S. P. Dom. Eliz.*, 1595-97, p. 347. In a later letter (p. 348) the "few years" become fifty years. "In Northumberland," he adds, "great villages are dispeopled," and these decays (p. 542) "are not, as supposed, by the enemy, but private men have dispeopled whole villages." About the same time, Tobie Matthew, bishop of Durham, is urging on Lord Burghley the revival of the statutes for tillage. (*Hist. MSS. Com., MSS. of the Marquis of Salisbury*, vii. 453.) The *Agricultural Survey* of 1810 dates the first inclosures in Durham from 1658 (p. 86).

[2] Ashley, *Introduction to English Economic History*, I. (ii.) 286.

[3] Cunningham, *Growth of English Industry, etc.*, I., 3d ed., p. 531.

districts, the latter has little substantial evidence to support it. Such evidence as there is, however, points to the conclusion that there was no perceptible slackening throughout the century. Not only do we witness an undiminished volume of contemporary complaint, a continued agitation and repeated efforts at investigation and repressive legislation, but we have the supporting testimony of the unpublished inquisition of 1566 for Buckinghamshire and of a long series of prosecutions against inclosers under the Elizabethan Tillage Act of 1563. The Buckinghamshire returns cover but five of the eight hundreds of the county, and, so far as can be made out from the often vague dating of the entries, deal with comparatively recent offences, probably with those occurring within less than ten years instead of the thirty of the more important inquiries of 1517 and 1607. Yet even with these limitations it tells of 4,065½ acres as affected by the inclosures in 50 towns of this single county. We seem to be dealing with a movement which at least from the middle of the fifteenth century was gradually but steadily acquiring momentum, and the figures for the period 1485–1517 may be used as a basis of reckoning, with no fear of thereby overestimating the amount of inclosure.

There is, indeed, more than a likelihood that any result so obtained will err in somewhat underestimating the acreage affected by the agricultural change. But for the rough approximation which is all we can hope to obtain it may sufficiently serve the purpose to construct a conjectural table from the known figures of the 1517 inquiry. We may assign a hypothetical figure for the thirty years preceding 1485, say an acreage equal to the returns from 1485 to 1499. Acting on the presumption that in the sixty years from 1518 to

1577 the rate of inclosing was at least equal to that of the period 1485–1517, we may double this known acreage; or, in the case of the six counties for which we have the acreage for the thirty years 1578–1607, we may take the sum of the two periods. Finally, in the case of the eighteen counties reported on in 1517, and not in 1607, we insert the earlier figures, and obtain the following conjectural results. The purely inferred totals in the table are indicated by italics.

Counties.	1455–1484. Acres.	1485–1517. Acres.	1518–1577. Acres.	1578–1607. Acres.	Total. 1455–1607. Acres.	Percentage of total area.
I. Northern (2) .	*2,866*	5,789½	*11,579*	*5,789½*	*26,024*	0.58
II. Western (3) .	*1,344½*	6,725½	*13,451*	*6,725½*	*28,246½*	1.62
III. Midland (14) .						
a	*1,050*	5,628	*11,256*	*5,628*	*23,562*	1.23
b	*13,287*	30,087	*75,617*	44,999 *531*	*164,521*	8.94
c	*13,442*	34,518	*72,059*	17,061½ *20,459½*	*157,559*	8.45
d	*4,849*	1,402 7,677½	*18,159*	7,677½ *1,402*	*41,167*	5.25
Total *a–d* .	*32,628*	79,312½	*177,091*	69,758 *28,020½*	*386,810*	6.03
IV. Eastern (3) . .	*6,441*	15,448½	*30,897*	*15,448½*	*68,235*	1.72
V. Southern (2) .	*577½*	1,695	*3,390*	*1,695*	*7,357½*	0.35
Total	*43,857*	108,971	*236,408*	*127,437*	*516,673*	2.76

Hypothetical as these figures are and somewhat underestimating the amount of inclosure as they probably do, they nevertheless, I venture to believe, bring us appreciably nearer the actual facts than any notions based upon the unsatisfactory evidence of the sixteenth-century literature, hitherto our main reliance. It is, I repeat, probably under rather than over the truth to say

that in the century and a half before 1607 something over half a million acres of cultivated land were taken out of the hands of the tillers of the soil, and inclosed for sheep pasture. But, granting freely to the arguments for an extent of inclosure larger than our figures indicate, all the consideration they deserve, the estimate could still be considerably increased and yet be far from supporting the extravagant assertions of contemporary and of modern writers. In truth, all the literary evidence of the period must be treated with a mistrustful caution. Its very exaggeration condemns it. It is impossible to believe that by the first quarter of the sixteenth century the population by reason of these inclosures had been "inestimably" diminished[1] and "mervaylous multitudes"[2] reduced to beggary and crime, that at the close of another quarter of a century two-thirds of the land of England were untilled and in "marvelous desolacion,"[3] when still each later generation reported that inclosing and its attendant depopulation were proceeding upon an unexampled scale. To cite but single specimens of these reports, Pilkington (shortly before 1575),[4] the Parliament of 1597,[5] Powell, in 1636,[6] were convinced, in the words of the last, that the evil was never "so monstrous, never so great." The statements of the men who witnessed the inclosing movement cannot, unfortunately, be accepted as "certain proofs"[7] of the extent or real social effects of the change.

[1] Proclamation of 14 July, 1526, *Harl. MS.*, 442, f. 64.

[2] Preamble to 25 Hen. VIII. c. 13 (1534).

[3] Bishop Scory in Strype, *Eccl. Mem.*, ed. 1822, II. (ii.) 482. And Proclamation of 1 June, 1548, *Soc. of Antiq. Proclam.*, iii. No. 24.

[4] Pilkington, James, "Exposition on Nehemiah," in *Works*, ed. Parker Soc., p. 462.

[5] 43 Eliz. cc. 1, 2.

[6] Powell, Robert, *Depopulation Arraigned*, 1636, p. 37.

[7] Gonner, E. C. K., in *Handw. d. Staatsw.*, 2d ed., ii. 391. "Über die Ausdehnung dieser Umwandlung liefern die Werke von Latimer, Starkey, Staf-

Their vision was too restricted, too prejudiced, too jaundiced. And moderns who, misled by them, could assert that by 1607 "in the greater part of England the inevitable change [from arable to pasture] had been already accomplished,"[1] must not only be unmindful of the social pessimism and the habit of loose statement common at the time, but must close their eyes to such facts as the comparatively steady range of grain prices during the century and the existence much later of great areas of still uninclosed open-field. The dispeopling of the countryside by covetous inclosers was one of the great bugbears of the period; but, apart from the indirect evidence of grain prices and eighteenth-century agricultural surveys, an examination of the contemporary inquisitions of depopulation tends to divest this spectre of its terrifying proportions.

If we are to sum up the broader conclusions of such an examination, this shrinkage which it necessitates in the estimate of magnitude of the inclosure movement would be the first thing to be noted. An agricultural change affecting 2.76 per cent., or even 5 per cent., of the total land area of twenty-four counties in a century and a half, is surely nothing very alarming. The gradual displacing of the agricultural population from their customary employment at the rate of 7,000, or even 10,000, every thirty years, would doubtless cause a certain distress in a body politic of England's dimensions in the sixteenth century. With the ignorance and hidebound conservatism of the English peasant, such a change would be more bitterly resented, the ill effects of such

ford, Harrison, u. a. untrügliche Beweise." Cunningham thinks that "the remarks of such writers as Sir Thomas More, the chancellor of the Realm, and Thomas Starkey, a Royal Chaplain, are conclusive as to the wide range over which the change was progressing." *Growth of English Industry*, 3d ed., 1896, i. 526.

[1] Gardiner, S. R., *History of England*, ed. 1893, i. 354, 355.

an uprooting more pronounced, than a similar social adjustment in the much more fluid industrial population of to-day. Yet the friction from inclosures, though thus relatively great, seems, nevertheless, in reality to have been confined to a comparatively small section of the people, and the shifting of population to have gone on gradually through successive generations. It might be urged that, in so far as it was effective, this mobilizing of the population, though its beginnings at the time would be felt as a social evil, was actually a national blessing in disguise,—a necessary first step towards England's later industrial supremacy. And it might be argued that the social effects of the exchange in some districts of grain for grass were to a certain extent offset by the quiet growth during the century of that movement towards the reclamation for arable of waste land, which became more marked in the two following centuries. But it is not difficult to realize how this tradition-defying change would lend itself to exaggeration in the imagination of the time. The eviction of husbandmen with their families,

> "The forlorne father hanging downe his head,
> His outcast company drawne up and downe,"[1]

the sight of the deserted homes and ruined churches,[2] perhaps as much as anything the tales of misery, losing nothing in repetition, which were spread abroad by the beggars swarming over the country and representing themselves, as they doubtless sometimes were, the victims of landlord oppression,[3]—all this would be magnified into

[1] Bastard, Thomas, *Chrestoleros*, 1598, lib. iii. epig. 22, ed. Grosart, 1880.

[2] Hall, Joseph, *Virgedemiarum*, ed. 1825, lib. v. sat. i.

> "Would it not vexe thee where thy syres did keepe,
> To see the dunged foldes of dag-tayled sheepe,
> And ruined house where holy things were said."

[3] Moore, John, *The Crying Sin of England*, 1653, p. 8. "Question many of our Beggers, that goe from dore to dore, with wife and children after them,

a menacing social evil, a national calamity responsible for dearth and distress, and calling for drastic legislative remedy. But, freed from contemporary hysterics, the specific inclosure movement of the period reveals itself as one of comparatively small beginnings, gradually gaining force through the sixteenth century and continuing with probably little check throughout the seventeenth century, until it was absorbed in the wider inclosure activity of the eighteenth century. If the general breaking up of the old three-field husbandry by this inclosure is to be called an "agrarian revolution," it was one which spread over three centuries of slow development, and found its real climax only after 1760. And the conversion of arable to pasture with the accompanying displacement of population—if in this lay the essence of the "revolution"—was for England, as a whole, in the sixteenth century scarcely comparable with the analogous change of the last thirty years. The statement that the sixteenth-century inclosure movement swept devastatingly over the English peasantry like the Black Death can only be termed a gross exaggeration.[1]

In the second place the statistical results from the inquisitions of depopulation, illustrated by the map, indicate that anything like activity in inclosing was limited to the Midland counties. This inference from our figures is confirmed by a study, in so far as the summary Record Office catalogues will permit, of the inclosure cases which during the first half of the sixteenth century were brought before the so-called Poor Men's Courts, the Courts

where they dwell, and why they go begging. Alas master (say they) we were forced out of such a town when it was inclosed, and since we have continued a generation of Beggers." An answer to Moore pertinently suggests: "Whether all they tell him in that kind to be true, or no, hee maye doe well to enquire, and not take it upon trust." *Considerations concerning Common Fields*, 1654, p. 17.

[1] Hasbach, A., *Die englischen Landarbeiter und die Einhegungen*, 1894, p. 20.

of Star Chamber and of Requests. It is borne out by the long list of prosecutions under Elizabeth's first Tillage Act (5 Eliz. c. 2), which are entered on the Exchequer Memoranda Rolls of the King's Remembrancer. From this latter source I have noted cases of inclosure during the period from 1558 to 1603, and of the 221 places here mentioned, the Midland counties alone furnish 51 per cent. The acreages in these suits do not seem trustworthy, given as they usually are by the informers in round and probably exaggerated figures; but here, again, of the total acreage the Midlands furnish 73 per cent. Within this central area it is, as in the previous results, the group (*b*) made up of the counties Warwickshire, Leicestershire, and, above all, Northamptonshire, which was pre-eminently the field of the incloser's enterprise.[1] The contemporary literature in its vague denunciation too rarely condescends to facts and places; but here, also, as far as it can be localized it refers to the Midlands. Rous and the Vicar of Quinton, at the close of the fifteenth century, brought from southern Warwickshire and the neighboring

[1] Inclosure cases under Act 5 Eliz. c. 2 (Exch. Mem., *King's Remembrancer*):—

	1558–1603.	
	No. of places.	Percentage of total acreage.
I. Northern Counties	25	5.02
II. Western Counties	15	4.61
III. Midland Counties		
a	18	2.90
b	60[a]	52.44[a]
c	32	15.68
d	3	1.70
Total *a–d*	113	72.72
IV. Eastern Counties	48	12.52
V. Southern Counties	17	4.08
Pembroke, Wales	3	1.05
Total	221	100.00

[a] Northamptonshire, 34 places and 40.25 of the total acreage.

north-eastern part of Gloucestershire the first clear and unmistakable reports as to the character of the change.[1] Armstrong specified "the Mydell parts of the body of the realme,"[2] the tract *Certayne Causes*, the counties of Oxfordshire, Buckinghamshire, and Northamptonshire.[3] The Tillage Act of 1555 recognized that certain parts of England were not affected in such a manner as to require legislative interference. Elizabeth's Act of 1597, with more precision, named these comparatively untouched counties as lying in the north-west, east, and south. John Hales, about 1549, laid the scene of his dialogue at Coventry, in the centre of England;[4] and a century later Halhead wrote against the same depopulating inclosures for sheep-farming from the same county of Warwickshire.[5] Practically all the contemporary indications—and the list of references could easily be extended—point in the same direction, to the Midland district.

To this view that the characteristic inclosures of the fifteenth to the seventeenth centuries were largely confined to the Midlands, there is the apparent objection that a number of early authorities may be cited as mentioning inclosed countries lying outside the central region. Professor Ashley on this evidence has marked upon his maps, as wholly or mainly inclosed in the fifteenth and sixteenth centuries, Suffolk, Kent, most of Essex

[1] Rossi, J., *Historia Regum Angliæ*, ed. 1745. He names (pp. 122-124) some fifty-four places which within a circuit of thirteen miles about Warwick had been wholly or partially depopulated before about 1486. He seems (p. 116) to be aware that the movement is confined "in umbelico regni." The letter of the Vicar of Quinton to President Mayhew of Magdalen College is printed in abstract in *Hist. MSS. Com.*, viii. (i.) (1881), 263, and in full in Denton, W., *England in the Fifteenth Century*, 1888, 318-320.

[2] Armstrong, *Treatise concerning the Staple*, ed. Pauli, p. 26.

[3] *Certayne Causes*, 1550-53, in Four Supplications, E. E. T. S.: E. S. xiii. 96.

[4] [John Hales] *Discourse of the Common Weal*, ed. Elizabeth Lamond (1893), 15.

[5] Halhead, Henry, *Inclosure Thrown Open*, 1650.

and Hertfordshire in the east, and most of Worcestershire with the north-western part of Warwickshire in the west of England. But if, when the chapter on the Agrarian Revolution was written, he could have had the benefit of Professor Meitzen's suggestions,[1] he would have hesitated, we may suspect, before classing these old inclosed districts among the inclosures of this period. Though the questions raised by Meitzen's researches demand in their application to England further and careful investigation, it seems clear that a distinction must be made between two quite differing forms of settlement and agricultural practice, one with the "nucleated village" and the open-fields, the other with its scattered farms and inclosed fields. In some sections the "old inclosures" may go back to an original settlement long before the Conquest, in others both settlement and inclosures may belong to a later period of reclamation from the forest and of inner colonization,—a chapter of English economic history still to be written. In any case, associated as they are with their own distinctive agricultural methods, they are not to be confused with the depopulating inclosures of open-field land characteristic of the later movement we are here dealing with. A contemporary writer excepts from his condemnation of inclosures "Essex, Hertfordshire, Devonshire, and such like Woodland Countries," where "euerie lordship is charitably diuided amongst the Tenants, and tillage also in most of their Closes is maintained, and Townes nothing dispeopled.[2] We may name from early evidence others of these at any rate in part old-inclosed "Woodland Countries." Suffolk, Kent, Sussex, Dorsetshire, Somersetshire, might be men-

[1] **Meitzen, A.,** *Siedelung und Agrarwesen*, 1895, ii. 118, and *Anlage*, 66 a, in the accompanying Atlas.

[2] **Trigge, Francis,** *The Humble Petition*, 1607, in *Dedication*.

tioned,[1] while large portions of the west and north of England seem likewise to have known little or nothing of the open-fields. Within the Midland open-field district itself there seem to have been areas of wooded, thick-hedged country with at most but sparse, outlying open-field villages. Such, for instance, in Buckinghamshire is the Chiltern region, contrasted by Leland with the "champaine" Vale of Aylesbury, or, in north-western Warwickshire, the "Arden," on the right hand of the Avon, noted by the same observer.[2] We may, in passing, mention East and West Gloucestershire as illustrating on the modern map the contrast between the two distinctive forms of settlement. The old-inclosed woodland countries may safely be neglected in a consideration of the inclosures of the fifteenth and sixteenth centuries.

A third general conclusion to be drawn from a study of the official inquisitions is that even in the Midland counties, in the region where the set of the current towards agrarian innovation was at its strongest, it had only succeeded in cutting numerous but narrow and scattered channels through the sandbars of custom and prejudice. It would be indeed somewhat surprising, were we not already guarded against contemporary asseveration, to discover in the midst of such wholesale complaint so comparatively few wholesale clearances. Armstrong, in the second quarter of the sixteenth century, talks of the destruction of 400 or 500 Midland villages within sixty years, but a tenth of his

[1] See Fitzherbert, *Surveying* (1523), ed. 1539, chap. 41, for Essex; Hales, *Discourse* (1549), ed. Lamond, p. 49, for "Essex, Kent, Devonshire, and such"; Tusser, ed. Dialect Soc., p. 141, for Suffolk and Essex; the *Considerations* of 1607 (printed in Cunningham, *Growth of English Industry*, ii. 702-3), for "Essex, Somerset, Devon, etc."; Blith, *The English Improver*, ed. 1640, p. 40, for Hertfordshire, Essex, Kent, Surrey, and Sussex; while in the edition of 1653 (p. 83) he adds Berkshire, Hampshire, Wiltshire, Somersetshire, and mentions among the "Woodlands" the "Westerne parts of Warwickshire and the Northerne parts of Worcestershire, Staffordshire, Shropshire, Derbyshire, Yorkshire, and all the countries thereabouts."

[2] Leland, ed. Hearne, *Itin.*, iv. ff. 192 a, 166 a, viii. f. 74 b.

estimate would undoubtedly be nearer the mark. Search through the two official inquiries for the Midlands, covering together over sixty years, reveals but a round two dozen villages or hamlets which were practically all inclosed and emptied of their inhabitants, the full half of them in Northamptonshire. But even here, the incloser's county *par excellence*, a competent local observer remarks, in 1712, that "the main body of the county is champaign [open-field], . . . the inclosures lie dispersedly up and down in the county. In some few places are four or five lordships lying altogether enclosed, . . . yet far the greatest part of the county is still open."[1] The inquisitions show that, in the main, the inclosures are of small holdings, ranging on the average for the Midland counties from thirty to sixty acres; and, were it not that the statute of 1490 took no account of decay associated with less than twenty acres, the average entry in the inquisitions would doubtless be lower. Apparently a piecemeal inclosure had long been going on, which, so far as size is concerned, was not very dissimilar to that which left its traces on the fields of Norfolk at the close of the eighteenth century.[2] The figures show that in 68.5 per cent. of the 1,090 villages reported on in 1517 the acreage affected was less than 100 acres, while the Midland inquiry of 1607 gives 48 per cent. of places with less than 100 acres.[3]

Despite the inadequacies of our statistical basis, its

[1] Morton, John, *The Natural History of Northamptonshire*, 1712, pp. 13, 15.

[2] Marshall, *Rural Economy of Norfolk*, 1787, i. 8, 9; Kent, *Agricultural Survey of Norfolk*, 1794, p. 22. "Wherever a person can get four or five acres together [in the open-field], he plants a white thorn hedge around it."

[3] Inquisitions.	Total no. places.	Acreage affected.						
		1–99	100–199	200–299	300–399	400–499	500–999	Over 1,000
1517–19. . . .	1,090	747	198	79	33	17	15	1
1607.	393	188	87	62	21	11	17	7

general teaching harmonizes with that resulting from a study of the great era of inclosures in the eighteenth century, and is not inconsistent with the little precise information that can be winnowed from the chaff of contemporary comment. It may be stated, to resume the argument briefly, that the specific inclosure movement of the fifteenth and sixteenth centuries, the depopulating inclosure of open-fields with a view to the greater profit of grass-farming, had not by any means the magnitude often ascribed to it; that it was, in other words, little more than the feeble beginning of an "agrarian revolution"; that, limited in amount, it was also circumscribed in area, being largely confined to the central districts of England, and even here was of a piecemeal character, so that, after more than two and a half centuries inclosures were only lying "dispersedly up and down."

But this sketch of the specific inclosing movement of the period does not touch all the features of the agrarian change. Besides the engrossing and consolidation of farms and the increase in rents and copyhold fines, which could and did take place without inclosure, there was still another type of inclosure, that of the common waste, which should be mentioned. Brinklow associated the two forms when he wrote that the "lordes flocks eate vp the corne, medows, heathes, and all together,"[1] and that this was not all exaggeration is plain from Fitzherbert's more sober statement.[2] While playing a minor rôle in the literature and legislation of the period, it seems, if number of law-suits are any criterion, that inclosures of common (as distinguished from common fields) caused more bickering and strife than the better known and more dramatic attack on the open-fields. Of the cases of oppressive inclosure complained of to the Privy Council

[1] Brinklow, H., *Complaynt* (ca. 1542), E. E. T. S.: E. S. xxii. 38.

[2] Fitzherbert, *Surveying*, ed. 1539, c. 8.

during the sixteenth century, almost all relate to the inclosure of common pasture or waste; and the records of the law courts show constant disputes over common rights in all parts of the country, bearing witness at once to the tendency to landlord encroachment and to the often successful force of popular resistance. These contests are, of course, not peculiar to the open-field districts, but were found in all parts of England, nor were they especially characteristic of this particular period. They form rather one phase of the long history of the approvement of the wastes which stretches back beyond the statute of Merton (1236), and, like the later movement for inclosure of the common fields, finds its culmination after 1760. This gradual and steady nibbling from the common wastes, going on for a longer time and over a wider area, was, however, accompanied for the most part by no such immediate and striking changes. Even within the boundaries of the open-field country it would tend rather to cramp than to destroy the three-field husbandry. But it contributed its share to the social discomfort, and increased the force of the reaction against inclosure in general.

If the extent of these inclosures and their social effects be reduced to something like the real proportions, sympathy with the inevitable pain of an era of social and economic transition need not be thereby diminished. We may still appreciate the sufferings, mental, as well as physical, of those who, rooted in tradition, bound by custom, abhorring innovation, were nevertheless pushed onward amidst vociferous complaint by irresistible and to them incomprehensible forces. They ascribed their ills to many causes, but below the surface we may discern the silent yet far-reaching effects of the general uplifting in western Europe not only of new price levels, but of new culture levels.

EDWIN F. GAY.

THE DIFFERENTIAL RENT OF FARM LAND.

It is a matter of common observation that, owing to differences in the chemical and physical properties of the soil, in the temperature and humidity of the climate, and in the distance from the central market, all farm land is not equally productive. No less familiar is the fact that some farms command a higher rent per acre than others. For a century or more it has been generally recognized that a close relation exists between productivity and rent. According to the text-books on political economy which are generally used in America to-day, rent varies in the same ratio as difference in productivity. By differences in productivity are usually meant differences in the value of the product of different farms of equal areas when cultivated with the same degree of intensity. "Rent," says Walker, "arises out of differences existing in the productiveness of different soils under cultivation at the same time, for supplying the same market. The amount of rent is determined by the degree of those differences. Specifically, the rent of any piece of land is determined by the difference between its annual yield and that of the least productive land actually cultivated for the supply of the same market, under equal applications of labor and capital."*

In this statement of the theory of rent two important factors are left out of account. It is apparently assumed that all farmers possess the same degree of efficiency, and that all land is cultivated with the same degree of intensity or else that variations in these respects do not make it necessary to modify the statement that differential rents are measured by differences in productivity. It is the purpose of this paper to consider the influence of variations in the efficiency of farmers and in the intensity of culture upon the amount of rent which will be paid for the use of land,

*F. A. Walker, *Political Economy*, p. 197.

and to point out that because of these variations differential rent cannot be measured in terms of differences in productivity.

Let us first turn our attention to variations in the efficiency of farmers and the way in which these variations make it necessary to modify the statement that rents vary in the same ratio as differences in productivity. (For the sake of simplicity, it will be assumed in this part of the discussion that the same degree of intensity of culture exists throughout the territory under consideration.) There are more than five million farmers in the United States. From general observations we know that some of these farmers can scarcely make a living, others live comfortably and gradually save enough to buy a small farm, while still others are very prosperous, living well and accumulating considerable sums of money from year to year. The relative degree of prosperity to which the American farmer can attain is determined largely by his own efficiency. By the efficiency of a farmer is meant his capacity to turn off work and to manage a farm. With equal opportunities some men can win a much greater return than others. Those who can produce a relatively large return are called the more efficient farmers, and those who produce a relatively small return are called the less efficient farmers.

We may speak of the qualitative and the quantitative efficiency of a farmer. In this paper we are interested in differences in qualitative efficiency. When two farmers employ equal amounts of labor and capital upon equal areas of equally productive land, the one who possesses a relatively high degree of qualitative efficiency can produce a larger return than his competitor who is qualitatively less efficient. This larger return is won by the farmer who is qualitatively more efficient because he shows greater skill in performing his work or uses better judgment in planning his farm operations, in regulating his field system, in selecting seeds, in choosing tools and machinery with which to do his work, or in the breeding and feeding of

stock. The farmer who is quantitatively more efficient can do more work of a given quality.

Variations in efficiency have long been recognized by all who observe industrial society, but the influence of these variations upon the amount of rent which will be paid for the use of land seems to have been overlooked by the economists who have written upon the subject of rent. The conclusion to which a study of this question leads will first be stated in a few words and then further elaborated.

While the farmers who possess a relatively high degree of qualitative efficiency can win a larger return from land of any grade than can their less efficient competitors, this extra product due to superior ability is greater on the more productive than on the less productive land; and for this reason the more efficient farmers compete only for the more productive land, and pay more for it than the less efficient farmers can afford to pay. If, therefore, we measure differences in productivity in terms of the differences in the value of the products which the least efficient or marginal farmers could produce on the various grades of land under comparison, differential rents will be greater than differences in productivity. Inasmuch, however, as competition among the more efficient farmers for the more productive grades of land leads to a distribution of the land among the farmers in accordance with their efficiency,—the most efficient farmers possessing the most productive and the least efficient the least productive land in use,—the differences in the actual yield of the different grades of land are greater than the differences in the yield which any given farmer could produce; and, since the better farmers could win, and retain as personal profits, an extra product on the marginal land above what the marginal farmers can produce on such land, and must be allowed a profit equally large on the better land to keep them from outbidding the marginal farmers for marginal land and driving them out of the farming business, the differential rent will be less than the actual difference in the value of the product of the more productive

and that of the marginal land. Hence the differential rent of land cannot be measured in terms of differences in productivity.

Let us suppose that the land which is necessary to supply the demand for a certain class of agricultural products, such, for example, as the products of the diversified agriculture of the corn belt, varies in productivity from A to B, that A grade land is twice as productive as B grade land, and

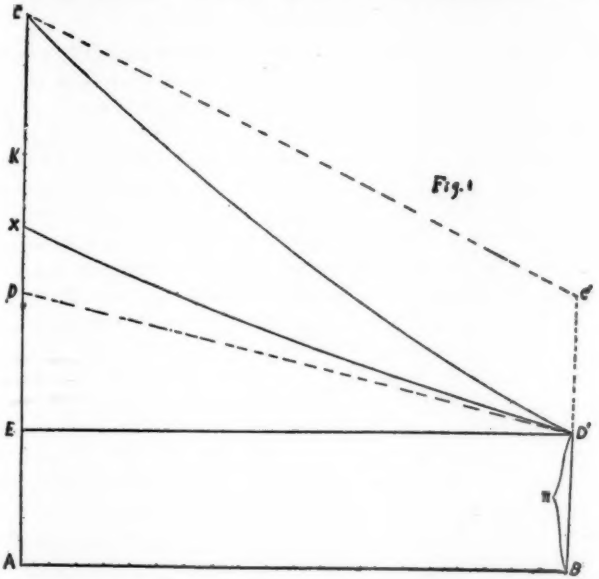


Fig. 1

that all other land under consideration is more productive than B and less productive than A grade land (see Fig. 1). Suppose, also, that all the farmers who are able to compete for the use of this land at a given time vary in efficiency from C to D (as represented in Fig. 1), that the farmer who has C degrees of efficiency is qualitatively twice as efficient as the one who possesses D degrees of efficiency, and that

the other farmers are graded according to their efficiency from C to D, as the land is graded from A to B. The farmer who possesses C degrees of efficiency can produce twice as much on land of any grade as the farmer with D degrees of efficiency. The D grade farmer is the marginal farmer, and must receive enough on marginal land to cover costs, including a living. On the A grade land, which is twice as productive as the marginal land, he can produce twice as much with the same outlay, and is willing to pay a differential rent for it equal to one-half the product.

Let us say that the D grade or marginal farmer's product on B grade land is valued at n (represented by line B D′ in Fig. 1), that his product upon A grade land is valued at $2n$ (represented by line A D), and that he is willing to pay a differential rent of n (line E D) for the use of A grade land. Then the value of the product of the C grade farmer, who is qualitatively twice as efficient as the marginal farmer, will be $2n$ (line B C′) on B grade land and $4n$ (line A C) on A grade land. Thus, while the C grade farmer can win an extra product valued at n (line D′ C′) on B grade land, his extra product on A grade land, above what the D grade farmer could produce, is valued at $2n$ (line D C). Hence the C grade farmer will not compete for B grade land until the rent on A grade land rises sufficiently to absorb half of this extra product, so that his personal profit will be the same on both pieces of land. Until rent rises to $2n$ on A grade land (that is, to point K in Fig. 1, and measured by line E K), the personal profit which the C grade farmer can win on such land will be greater than that which he could win from B grade land. If the differential rent of A grade land should rise to $2n$ (that is, to point K), the C grade farmer's personal profit on A grade land (represented by line K C) would be the same as that which he could win on B grade land (represented by line D′ C′), being valued at n in either case. But, while the C grade farmer will pay a rent of $2n$ for A grade land rather than farm marginal land, the D grade farmer will take marginal land rather

than pay more than n for A grade land. With the given hypothesis the differential rent of A grade land will not be less than n (measured by line E D), for the D grade farmer can afford to pay that much for its use. It will not rise higher than $2n$ (measured by line E K), for the C grade farmer would then prefer marginal land, for which no economic rent is charged.

With all grades of farmers competing for the use of land, the differential rent of A grade land will be greater than n; for, at a rent of n, all but the marginal farmer will prefer it to inferior land, because the extra product, due to superior qualitative efficiency, is greater on the more productive land. Each farmer seeks to win the largest possible personal profit; and, as a result of competition for the better land, rent will rise, until one by one the less efficient farmers find it preferable to take less productive land at a lower rent. The most efficient farmer can pay more for the best land than any of his competitors can afford to pay, and still receive a larger personal profit for his superior efficiency than he would receive from the less productive land at the lower rents which the less efficient farmers pay. Differential rents will, for this reason, be greater than the differences in productivity when we measure productivity in terms of the value of the product which the land will yield when farmed by the marginal farmer.

When each farmer has taken the land for which his degree of efficiency enables him to compete to best advantage, the marginal farmer will be found upon marginal land, the average farmer upon average land, and the most efficient farmer upon the most productive land. The product resulting from this most economical application of efficiency to productivity will be measured by the area A C D′ B (Fig. 1). It will be noticed that the line C D′ is not a straight line. This is not a straight line because its distance from the line A B is determined by multiplying productivity by efficiency, both of which are decreasing factors as we go from the most productive to the marginal land. With

regular and infinitely close gradation of land and of farmers, this line would tend to become a regular curve. This curve will probably be irregular, however; for the continuous and regular gradation of land and of farmers which would be necessary to produce a regular curve, gradually falling from C to D′, could, perhaps, never be found.

The line X D′, which may be called the rent curve to distinguish it from the product curve C D′, is drawn arbitrarily to illustrate the way in which rent will rise above line D D′. Point X will be some place between D and K, because, as has been shown, the differential rent of A grade land can neither be less than n nor more than $2n$. With continuous and regular gradation of land and of farmers this rent curve would be regular, but with irregular gradation of either factor it will be irregular. Thus the area E D D′ (Fig. 1) represents the differential rent where all farmers have the same degree of efficiency as the marginal farmer, and the area D X D′ represents the further differential which arises from variations in the efficiency of the farmers. These two constitute the differential rent which would be paid under the conditions laid down at the beginning of this discussion; namely, equal amounts of labor and capital on all grades of land and perfect competition.

The remainder of the surplus represented by area X C D′ goes to the farmers as personal profits, the amount of personal profit received by a given farmer depending upon his relative degree of efficiency.

In this illustration we have considered competition in but one kind of agriculture. The most efficient farmer in one branch of agriculture may be less efficient in another. The best shepherd may be a poor market gardener and *vice versa*. The shepherd will be able to win his largest surplus on cheap lands, while the market gardener can do best on expensive lands near the market. Yet the general principle holds that the best shepherd can win the largest personal profit on the best sheep lands and the best market gardener on the land best suited to his particular business.

Indeed, it would seem that this principle may be applied quite generally, and that it explains why the more efficient men in all lines of economic activity are able to outbid the less efficient for the better instruments of production and for the better grades of labor.

Let us next consider the influence upon differential rents of variations in the intensity of culture. All grades of land are not cultivated with the same degree of intensity. The more productive land is usually cultivated more intensively than the less productive. More units of labor and capital can be applied to it with profit, and all of this extra labor and capital, except the final increment, yields a surplus which may be drawn upon as rent.* Hence, even though all farmers possessed the same degree of efficiency, the amount of rent paid for the different grades of land would not vary in the same ratio as differences in the value of the product which a given amount of labor and capital would produce on equal areas of these different grades of land.†

To make this point clear, it will be necessary to present in a somewhat modified form the subject of intensity of culture and diminishing returns. In the ordinary treatment of this subject, two questions which are essential to the present discussion are omitted. The first of these questions pertains to the degree of intensity which will prove most profitable, the second to the influence of the payment of rent upon the degree of intensity which will yield to the farmer the largest net return.

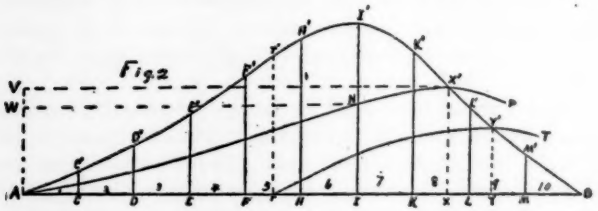
What degree of intensity is most profitable? How much labor and capital should be applied to an acre of land in the production of corn, or in the production of oats, or any other crop, in order that the farmer may win the largest net

* Ricardo, Section 26; McCulloch's Notes to A. Smith's *Wealth of Nations*, Note III.

† Since writing this paper, my attention has been called to a short article by R. P. Falkner, in the *Annals of the American Academy*, vol. xii. p. 89, entitled "Some Aspects of the Theory of Rent," which discusses this same point.

return? This is a question of first importance; for, if too much is expended, the net return will be cut down, and, if too little is employed, the net return will not reach the maximum. There is always some degree of intensity which will yield the largest net return. But what is that degree of intensity?

For the sake of simplicity, let us first suppose that the farmer can get as much land of a given grade as he may want to use, without paying anything for it. Under such circumstances, how much labor and capital should he expend upon each acre of land? It is obvious that in the production of corn, for example, the application of one dollar's worth of labor and capital to an acre of land will ordinarily produce very little, if any, corn at all. It is possible that two dollars' worth will produce a small crop;



but, then, the third dollar's worth will increase the product more than the second, the fourth more than the third, and so on until the point of stationary returns has been reached, after which the succeeding units continue for a time to add to the total product; but these succeeding units are less and less productive, until a point may be reached where further applications will add nothing to the total product. Thus the returns to succeeding units of labor and capital in agricultural production follow the law of increasing returns until the point of stationary returns has been reached, after which the law of diminishing returns operates.

This may be illustrated by means of a diagram. In Fig. 2

the units of labor and capital applied to a given acre of land are measured on the line A B, commencing at A. The line A I′ B represents the increasing and diminishing returns per succeeding unit. Having in mind land with a given degree of productivity, the distance between lines A B and A I′ B will depend upon the degree of qualitative efficiency possessed by the farmer who applies the labor and capital. For this reason it will be necessary to keep in mind a *given farmer*, as well as a given piece of land. When a given farmer employs labor and capital upon a given grade of land, we may speak of the area A C′ C (Fig. 2) as representing the product of the first unit of labor and capital expended, and of the area C C′ D′ D as representing the product of the second unit, and so on for the succeeding units. As illustrated in Fig. 2, the product of each succeeding unit is greater than the one preceding it until six units have been expended, after which each succeeding unit may be said to yield a smaller product than the one immediately preceding it.

With this illustration (Fig. 2) before us, suppose the farmer has one thousand units of labor and capital to expend in agricultural production. With free land at his disposal, how many acres will he use and how many units will he employ upon each acre? Will he apply five units of labor and capital per acre, and use two hundred acres of land? No, his capital will produce a greater *total product* when he applies six units to each acre and confines himself to one hundred and sixty-six and two-thirds acres. But will this make his labor and capital *most* productive? At the first thought one would say yes, because the seventh unit is less productive than the sixth; but, upon looking more closely into the matter, it is apparent that there is no good reason for ceasing to apply more units of labor and capital, simply because the point of diminishing returns has been reached. The seventh unit may be less productive than the sixth, and yet be more productive than any of the first four units. The *average* product per unit of labor and capi-

tal may be greater when seven units have been applied than when only six have been expended. Hence the total product of the thousand units may be greater when seven units have been applied to each acre and only one hundred and forty-three acres of land employed. But at what point shall the farmer cease to increase the application of labor and capital to a single acre? It is obvious that there is a limit to the amount of labor and capital which can be expended profitably upon a given area of land, that a thousand dollars' worth of labor and capital applied to one acre of land in agricultural production would yield a smaller return per unit of labor and capital employed than when more land is used and the number of units applied to each acre more limited. But what is the limit? It is true that in the case before us the sixth unit increases the total product more than any unit before or after it, but all units cannot be *sixth* units. The first, the second, and the third are indispensable: hence it is the *highest average return* which we must keep in mind. The average product per unit increases rapidly until the sixth unit has been employed, and then less rapidly until a point is reached where the slightest increase in the application of labor and capital will not increase the average product; and, because the law of diminishing returns is operating, the application of another unit, however small, will reduce the average product of all units employed.

The thousand units of labor and capital are used in the most productive manner when the acreage is so limited that the number of units applied to each acre is just sufficient to yield the maximum average product per unit. This highest average is attained only when the degree of intensity is such that the final increment of labor and capital applied to each acre produces no more or less than the average. For example, the highest average return is gained by the application of X units in the case before us in Fig. 2, where the location of X is determined by the fact that the rectangle A V X′ X is drawn in such a manner that its area equals the

area A I′ X′ X, which represents the total product of X units of labor and capital. Had the application stopped at I, after the application of only six units, the total product would be represented by area A I′ I, or the rectangle A W N I, and the average return per unit would have been less. Likewise, had the applications been increased to nine units, the average return per unit would have fallen. Hence we may draw a curve of increasing and diminishing *average returns*, based upon the increasing and diminishing returns of successive units. This curve of averages, represented by line A X′ P (Fig. 2) must be so drawn that the distance between the lines A X′ P and A B will at all points be such that the rectangles formed by drawing a line parallel to A B (line W N, for example) through the curve A X′ P at any point will represent the total product when applications have reached the corresponding point on line A B. That part of the rectangle lying between the lines H H′ and I I′, for example, will represent the average return per unit applied up to that point. As illustrated in Fig. 2, the curve of averages reaches the highest point at X′, and the highest average product per unit of labor and capital is gained by employing seven and three-fifths units per acre. After the point X′ is reached, the line of averages, X′ P, falls; for, after X units have been applied, further applications of labor and capital will reduce the average product per unit. Thus, when there is no rent to pay, the application of labor and capital should increase until the point of maximum average returns per unit is reached, and there it should stop. This is the most extensive agriculture that can be profitable under any circumstances, and the most intensive that can be profitable to the farmer where nothing is paid for the use of land.

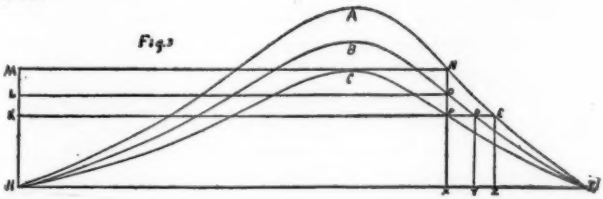
The payment of a *share rent* does not tend to increase the intensity of culture. The share rent increases as the total product increases; and we may think of it as taking some fixed portion, say one-third, of the product of each succeeding unit of labor and capital applied, so that the farmer

gets only two-thirds of the product of each unit, and his share reaches the highest average return per unit with the same degree of intensity which yields the highest average gross return per unit.* Hence, where the share tenants follow their own self-interest, they will farm no more intensively on the best land when poorer grades of land have been resorted to than when only the best grade was cultivated.

But, where fixed rents are paid or where the farmers own the land which they cultivate and count interest on its market value, the better land will be cultivated more and more intensively as poorer and poorer grades of land are brought into cultivation. Suppose that three dollars per acre must be paid. This rent is paid once for all. We may think of it as taking all the product of the first four and one-half, or *r*, units of labor and capital (Fig. 2). The farmer receives no return upon his labor and capital until the rent is paid. Should he cease to apply labor and capital when *r* units have been employed, the product would just pay the rent. Whatever he produces by further applications may be kept as payment for labor, capital, and superior efficiency. In this discussion we shall speak of that share of the product which is left after paying the rent as a net return. When there is no rent to pay, the farmer seeks the highest average *gross* return per unit of labor and capital employed; but, where a fixed rent must be paid, he no longer seeks the highest average *gross* return, but the highest average *net* return. The average net return per unit follows the law of increasing and diminishing returns in the same manner as the average gross return. But, when a fixed rent is paid, the line of increasing average net returns starts at point *r* (Fig. 2); for all of the product of the first four and one-half units is required to pay the rent, and the average *net* return at that point is zero. After the application of five units the average net return per unit will be represented by one-fifth of the area r r′ H′ H. After the

*This point is capable of mathematical demonstration.

application of the sixth unit, it will be one-sixth of the area r r′ I′ I. After the application of the seventh unit, the average will be one-seventh of the area r r′ K′ K. Thus the line of average net returns (Line r Y′ T in Fig. 2) rises rapidly until the line I I′ is crossed, after which it rises less rapidly until it crosses line I′ B, after which it falls. When a fixed rent is paid, the line of average *net* returns can never rise so high as the line of average *gross* returns, and the point Y′, where the line of average net returns reaches its maximum distance from the base line A B, will always be farther to the right than point X′; and hence the highest average net return per unit of labor and capital employed on land for which a fixed rent must be paid will be gained by a more intensive culture than when the same land could be had free.



The degree of intensity of culture which will prove most profitable on a given piece of land will vary with the amount of the fixed rent which is paid for its use,—the greater the amount of rent, the higher the degree of intensity.

Suppose that our farmer has three grades of land to choose from. These three grades of land are represented by the letters A, B, and C (Fig. 3), the latter being marginal land. The curves H A I, H B I, and H C I represent the increasing and diminishing returns to succeeding units of labor and capital upon the different grades of land. We have simplified the actual conditions somewhat by taking a case where the lines of increasing and diminishing returns have a definite relation to each other. The largest gross return per unit of labor and capital will be gained from each of

these three pieces of land when X units (measured by line H X, in Fig. 3) have been expended. With this expenditure upon each of the three grades of land, the value of the product which a given farmer can produce on A grade land will be represented by area H M N X; that of B grade land, by the area H L O X; and that of C grade land, by area H K P X. But the same amount of labor and capital will not be applied to the three grades of land. A differential rent will be charged for the better grades, and a more intensive culture will, for this reason, prove profitable. By the time increasing rents on the higher grades of land make it profitable for the farmer to apply X units of labor and capital to C grade land, it would be profitable to apply Y units to B grade land and Z units to A grade land. It is true that these further applications on the better grades of land will not yield a return equal to the highest average *gross* return per unit on these grades of land; yet the average net return will be increased by these extra applications, and all but the final increment will yield a return higher than the maximum average upon C grade or marginal land.

We are now in a position to see more clearly the influence of varying degrees of intensity of culture upon differential rents. In our illustration the surplus which a given farmer can produce on A grade land over what he can produce on C grade land is represented by the area K M N E, which is greater than the area K M N P by the area P N E; but the area K M N P measures the difference in the value of the product which he could produce on the two pieces of land with the same amount of labor and capital. Hence it is not simply differences in productivity with the same outlay, but differences in the capacity of the land to yield a surplus, that determine how much more highly a farmer will estimate one piece of land than another of the same area.*

Variation in productivity is, to be sure, the primary occasion of differential rent; but this rent cannot be *measured*

*Marshall's *Principles of Economics*, 2d ed., p. 214 *et seq.*

in terms of differences in productivity. To the differential arising from variations in productivity under equal applications of labor and capital must be added the differential due to variations in intensity of culture. These together constitute the differential surplus. If all farmers possessed the same degree of efficiency, this differential surplus would represent the differential rent, being the amount which all farmers would as willingly pay for the better land as consent to farm the poorer land. But because of differences in the efficiency of farmers the amount of differential surplus which a given piece of land will yield is not a definite amount, but varies with the efficiency of the farmers; and competition determines what share of the surplus which a given farmer can produce will actually be paid as differential rent. The differential rent of the better grades of land will be greater than the differential surplus which the marginal farmer could produce upon such land, but it will be less than the surplus which the most efficient farmer can produce.

With perfect competition the differential rent of any grade of land will be measured by the differential surplus which the marginal farmer could produce upon such land plus the further differential arising from differences in the efficiency of farmers. Hence, instead of a simple differential rent arising from one variable, we find a complex differential resulting from the interaction of three variables,—variation in the productivity of land, in the intensity of culture, and in the efficiency of farmers.

This, to be sure, is not all there is to be said upon the subject of differential rents. The varying conditions are so numerous and so complex that it is next to impossible to make a brief and final statement of the causes and conditions which determine the amount of differential rent that is paid for a given piece of land. Yet it is hoped that by further analysis we may, in time, be able to see more clearly those forces and conditions which regulate the price which is paid for the use of land.

HENRY C. TAYLOR.

THE REPORT OF THE VICTORIAN INDUSTRIAL COMMISSION.

AMERICAN readers are now familiar with the notable report made in 1901 by Judge Backhouse of the New South Wales Commission of Inquiry into the working of the arbitration laws of New Zealand and other colonies of Australasia.* Another valuable report along the same lines was made in February of the present year by a "Royal Commission appointed to investigate and report on the Operation of the Factories and Shops Law of Victoria." This Commission, which was authorized by the Victorian Parliament in amending the factory laws in 1900, was appointed June 18, 1900; but, owing to the resignation of some members and changes in Parliament which rendered others ineligible, it was virtually reconstituted in February, 1901. It interpreted its powers liberally; and, in order to frame recommendations on broad lines, visited New Zealand and New South Wales to study the operation of their compulsory arbitration laws, which have resulted in public regulation of wages in much the same way as through the special wages boards created in Victoria under a minimum wage law.†

Before reporting upon the operation of the characteristic labor laws in the principal colonies, the Commission surveys the progress of labor legislation in Australasia, and gives the following summary thereof:—

Labor legislation in the provinces of Australasia, although for a generation past it has been subject to many vital

*The report was summarized in the Bulletin of the Massachusetts Bureau of Labor Statistics and United States Department of Labor, and reprinted in large part by the New York Department of Labor (Bureau of Mediation) in its 1901 report.

†The chief factory inspector of Victoria, in his Report for 1901, estimated that about 35,000 out of some 55,000 factory workers in the colony would be under the minimum wage law when the thirty-eight special wages boards authorized by Parliament had made their determination.

changes, bears the impress of a steady and continuous development, its declared principle, however imperfectly carried out in practice, being an assertion of the right of the State to intervene between employer and employed for the purpose of regulating and defining the duration and general conditions of certain kinds of human labor, as well as in some instances the wages justly payable for the work done.

Beginning in Victoria, in the year 1873, with a short statute which enacted that no woman or girl should be required to work for hire in a factory for more than eight hours in a day, it at first advanced on the lines of English legislation, making humane provision to guard the health and safety in life and limb of work-people in factories and shops, by enjoining the observance of strict rules for cleanliness, air space, sanitation, and protection from risk of accident by machinery. Gradually, most of the other States adopted similar laws, which resulted in larger and better equipped factories, with, in many cases, shorter hours of labor, thus transforming to a great extent the insanitary conditions which have previously existed in factory life to those of comparative health and comfort.

Twenty years passed away, when, in the year 1894, the Parliament of New Zealand made a novel and daring experiment by adopting a law which created a compulsory court of arbitration, with power to make awards in trade disputes, including the fixing of wages and hours of labor. This measure provided also for district boards of conciliation, whose special function was to endeavor to bring about agreements in the earlier stages of trade disputes. At the same time they were empowered to draw up recommendations for the settlement of all points at issue, including the duration of labor and rates of payment. Such recommendations, although filed as their finding on the merits of any case referred to them, were subject to review by the Arbitration Court on the complaint of any party to dispute.

This measure, the Industrial Conciliation and Arbitration Act of 1894, was followed in Victoria, in the year 1896, by a law which introduced sweeping changes in the factory legislation then existing in this State. Its most important feature was a provision for the establishment of wages boards for six trades which recent investigation had shown to be subject to unduly long hours of labor, with too often miserably low rates of pay. The employees affected were those engaged in the making of *bread*, *boots*, *furniture*, *men's* and *boys' clothing*, *shirts*, and *underclothing*. Four years afterwards the main principle of this law was further extended by a provision in an amending act which brought a seventh trade, that of butchers, under the board system, and empowered either House of Parliament to declare by resolution that similar boards should be created to fix wages in any process, trade, or business usually or frequently carried on in a factory or work-room.

With the exception of South Australia, which, in addition to a voluntary conciliation act, at length accepted the principle of wages boards in a measure that, owing to certain regulations being disallowed by the local legislative council, has not yet been brought into operation, the other States refrained for a time from setting up tribunals to regulate rates of wages. But in December, 1900, western Australia adopted as its labor statute the chief provisions of the New Zealand law, with some unimportant modifications to suit local conditions. Lastly, towards the end of 1901, after a searching investigation into the working of the factory laws of Victoria and New Zealand had been made on the spot by a judicial commissioner, the Parliament of New South Wales passed a bill, framed almost entirely on the lines of the New Zealand measure, which authorized the establishment of a court of arbitration with plenary powers to deal with all trade disputes within the State, whether submitted to it by the contending parties or referred to it for settlement by its own registrar. In preparing this bill for submission to the legislature, the

New South Wales administration made a very important change in the New Zealand model, inasmuch as, while taking power for the recognition of voluntary industrial agreements between employer and employed for a given term, the matter relating to territorial boards of conciliation was studiously excluded, provision being made in early drafts for a board of reference only for the whole of the State.

THE NEW ZEALAND COMPULSORY ARBITRATION ACT.

This law is already too familiar to American readers to justify the repetition here of the Commission's summary of the statute.* Concerning the working of the act the judgment of the Commission usually coincides with that of the New South Wales Commission. The Victorian Commission, however, does not share in Judge Backhouse's view of the conciliation boards, provision for which was omitted from the New South Wales act.

The Conciliation Boards.—While admitting that these local boards have not achieved the success which was expected of them, since they have rendered few decisions that have not been immediately appealed to the central Court of Arbitration, the Commission believes the defect should preferably be remedied by increasing their powers rather than by abolishing them. Even while their power is limited to the making of recommendations, it is admitted on both sides "that the boards have done much valuable work in sifting evidence, in smoothing away misconceptions and prejudices, and, in brief, in bringing hostile disputants to some extent into accord before they delivered their finding or 'recommendation.'" The Commission emphatically believes in the principle of conciliation, even in a compulsory system of arbitration. In fact, some scope for voluntary effort must be preserved or the constant

*The text has been printed in the Bulletin of the United States Department of Labor, and, in its latest revision, in the 1901 Report of the New York Department of Labor, while the system has been described in the reports of the United States Industrial Commission, H. D. Lloyd's *Newest England*, etc.

application of compulsion will divide employers and workingmen into two bitterly hostile camps. "Already," we are told, "the frequency of references, first to the Boards and then on appeal to the Court, thus using to the utmost the compulsory rather than the voluntary principle of the law, has led to a feeling of distrust and unrest on the part of the employers,—a feeling of being under constant surveillance, as one witness expressed it, and a fear that, although they have no dispute with their workmen, they may at any time be cited at three days' notice to appear before Court or Board because some other employer has, in the opinion of an industrial union, underpaid his men or in some other way treated them unjustly."

The Commission quotes the opinion expressed by the president of the Arbitration Court, Mr. Justice Cooper, who in April, 1901, said that the boards "had done their work faithfully and well," and were a very necessary part of the act. "To sum up the whole position," concludes the Commission, "the Boards to which public criticism has been directed have been unfortunate either in the choice of members made by the electing bodies, or owing to their chairman being distinctly lacking in tact and fitness for the onerous duties of the office." The Commission cites two instances of obvious error, to speak charitably, in the choice of representatives. In one case a member is reported to have said, "I give you notice that I am here as a partisan; I do not think that I am in the position of an impartial judge here; I am here to represent one side of the case, and I intend to do that at every opportunity." Clearly, conciliation is far removed when partisan spirit like this is manifested by a member of the board wherein "the great aim must be to eliminate the personal element, the taking of sides, and the tendency to indulge in heated discussions and recrimination."

The Court of Arbitration.—"As a whole," says the Commission, "the work of this tribunal is held in high estimation by both sides, and its decisions are regarded with re-

spect. . . . Where a tribunal is held in such general esteem, criticism in matters of detail in debatable questions is out of place." The only complaint mentioned is the delay in giving decisions, which has resulted from the large number of cases that come before the court.

Industrial Regulations established under the Arbitration System.—Upon the establishment of a minimum wage the earliest difficulty to arise is the problem of the infirm or slow worker,—the man who is unable to earn the prescribed minimum, and would therefore be dismissed unless special provision were made for him. The law authorizes the issuance of permits to such workers; and, when application for such permit is made, it is usually adjusted by the employers and the union officials, and, in the event of their failure to agree, is referred to the chairman of the local Conciliation Board. All of this negotiation takes time, and creates some friction; and the results thus far obtained have not been satisfactory. "It is clear," concludes the Commission, "that the problem how to effectually protect and provide a livelihood for the slow and inferior worker without impairing or breaking down the principle of the minimum wage has not yet been properly solved in New Zealand."

Another problem that is as far from solution in New Zealand as elsewhere is that of apprenticeship, or industrial education. To prevent an over-supply of mechanics and the competition of low-priced labor, the unions have demanded that the proportion of apprentices to journeymen be fixed at one to three or four, and this has become the general rule by order of the boards and court. Such a policy involves the danger of unduly closing the avenues of employment to the youth of the colony; and the court last year refused to limit the employment of boys in the grocery trade, and emphasized, "in the interests of the working classes themselves, the principle that youths should not be improperly shut out from legitimate means of earning a livelihood." To prevent abuses, the court fixed a

scale of wages on the basis of age. The fact is that we are now passing through a period of transition in which apprenticeship has everywhere fallen into disuse without the discovery of any satisfactory substitute.

The issue of unionism *v.* non-unionism has naturally been settled in New Zealand by the triumph of the former, since the very act of setting the arbitration system into motion demands association of the workers. But such activity in behalf of higher wages, shorter hours, etc., involves trouble and expense, although not so expensive as strikes; and as compensation for such trouble and expense the unionists have demanded that the awards shall require the employer to give them preference in employment, since they share with non-unionists the benefit of any advances in wages, etc. Such awards, however, attach to the clause for preference of unionists a provision that any competent journeyman of good character and sober habits shall have the right of entry into the union concerned, without ballot or other election, on payment of not more than $1.25 as an entrance fee and 12 cents as a weekly contribution. At the end of 1901, 23,769 of 57,098 workers in the trades under notice were members of industrial unions.

Appearance of Counsel before Boards or Court.—The Commission found a distinct "unwillingness on the part of employers and employed to permit barristers or solicitors to appear either before the Boards or the Court on behalf of parties to disputes," which crystallized in the amendment of 1901 forbidding such professional participation. This hostile attitude towards the formalities of legal procedure has had much to do with the successful operation of the law. "The reasons are not far to seek," says the Commission. "The delays which in many cases seem to be inseparable from legal procedure strike at the very root of the main advantages claimed by the advocates of these trade tribunals; namely, a prompt and continuous hearing once the case is begun, and speedy settlement of matters at issue, after eliminating everything but the

essential points requisite for a just award. Further, the bill of costs, although not of so much moment to a strong company or association of employers as it is to the wage-earning classes, is looked at askance by both sides."

Conclusion.—The indorsement which the Victorian Commission gives to New Zealand's arbitration system is so unequivocal that one or two paragraphs must be reproduced here:—

> Despite certain defects in detail, which have been revealed by experience, the New Zealand Conciliation and Arbitration Acts remain to-day the fairest, the most complete, and the most useful labor law on the statute books of the Australasian States. And it is, on the whole, a wise social law, on the one hand protecting the fair-minded employer from the dishonest competition of the sweater, who keeps down the cost of production by paying miserably low wages, and, on the other, the toiling thousands, to whom a rise in wages of a few shillings a week, when an industry can fairly bear it, often means the difference between griping poverty and comparative comfort. But beyond that it has the great merit of providing effective means for preserving unimpaired the industrial relationship of employer and worker, in forbidding the miserable warfare which displays itself in strikes and lockouts, and the stern reprisals which too often accompany them, while ample opportunity is given for conciliatory methods of settling disputes before compulsion is evoked.
>
> The law may fairly be said to have passed successfully through its period of probation. Its main principles have stood the test of time; and, while employers and workers alike keenly criticise each other's actions in connection with its operation in certain industrial centres, in no part of the colony which we visited did we hear any general desire expressed for its repeal. Many suggestions were, indeed, made for minor alterations; but they were put forward with the view of improving the general administration of the act, while preserving its main principles in their integrity.

The act has virtually abolished strikes during the last seven years, no stoppage of work having occurred that was of more than local importance. All industries have prospered with the sole exception of the boot and shoe trade, wherein imports from the United States and Great Britain have increased largely since 1898. Boot and shoe men admit, however, "that the decline in home manu-

factures is largely attributable to specialization of work in the processes of boot-making and the diminished cost of production by the use of the finest machinery at places like Boston and Northampton."

On the other hand, the Commission notes the general recognition of the fact that in the present period of prosperity everything has thus far been in favor of substantial profits, and hence high wages and awards, favoring the workers. It does not attempt to prophesy the effect of reviewing the awards in a period of adversity with the possibility of reductions in wages. It is sufficient to note that the law has at present the overwhelming support of the people of New Zealand. Only last September "a motion was brought forward in the legislative council requesting the government to take into consideration the administration of the act by the Court, but it met with scant support, being rejected by twenty-five to four votes. . . . The debate, although brief, was instructive to this extent: it showed that the House in dealing with the motion reflected the overwhelming force of public opinion."

Compulsory Arbitration in New South Wales.

The Industrial Arbitration Act came into force December 10, 1901; but the officials were not all appointed until the end of April, 1902, and did not enter upon the first hearing until May 10, 1902. The act, therefore, had not been in operation many months at the time the Victorian Commission made its report, and its working is still experimental. At the end of 1902 judgment had been given in five disputes, and five industrial agreements were filed.

The New South Wales Act differs in several important particulars from its prototype in New Zealand:—

(1) It has done away with the local conciliation boards.

(2) It imposes heavy penalties upon any action in the nature of a strike or lockout, and authorizes the registrar to set the arbitration machinery in motion when no industrial union, of employers or employees, takes the initiative.

(3) It provides that an award may be made a *common rule* of an industry for an entire city or district, where the New Zealand system, to attain the same end, requires the citation by the court of individual employers.

(4) No reference can be made to the court for the hearing of a dispute, unless it is authorized by a majority of the members present at a specially summoned meeting, the vote being taken under special regulations.

(5) Counsel may be employed to appear at hearings.

The prohibition of strikes and the strict regulations concerning the industrial unions have naturally created some dissatisfaction. "The strict control," says the Commission, "is already a sore point with some hot-headed members of labor unions, who complain that they have been cajoled to give up their greatest weapon of offence and defence, the right to strike, for a mess of pottage,—the reference of all issues in industrial disputes to legal process and investigation."

The Commission thinks complaints about the expensiveness of proceedings are justified. In one dispute the levy on each member of the employers' union was said to be £25. But, if the costs are burdensome to employers, they are likely to prove ruinous to the labor unions, when counsel are engaged. The Newcastle Wharf Laborers' Union paid £200 in law fees for the conduct of their case, while nearly £100 more was disbursed for general expenses."

The Victorian Wages Boards.

The bulk of the report is devoted to the special wages boards created, for the most part, in 1896, as a result of pitiless disclosures of the "sweating" evil in Melbourne. The idea of establishing a minimum wage and maximum working hours was carried out for six industries in the years 1897–99. Each board consisted of ten members, elected in equal numbers by the employers and the employees in each industry, and a chairman elected by the board from outside. The following minimum rates for

experienced adult workers were established by the boards, promulgated in the official *Government Gazette*, and thereby made binding upon all employers in the industry concerned:

Industry.	Date when determination took effect.	Minimum wages for adult.			Piece-price schedule.
		Males.		Females.	
		Per hour or day.	Per week.		
Bread-making & baking,	Apr. 3, 1897 May 19, 1900	1*s.* an hour 12½*d.* an hour	48*s.* = $12 50*s.* = $12.50	—	No.
Furniture	Apr. 19, 1897 Oct. 24, 1898 Aug. 20, 1900	7*s.* 6*d.* a day 8*s.* a day	45*s.* = $11.25 48*s.* = $12	20*s.* = $5 a week	No.
Boots and shoes*	Dec. 29, 1897 July 18, 1898 June, 1902	6*s.* a day† 7*s.* a day 7*s.* 6*d.* a day	36*s.* = $9 42*s.* = $10.50 45*s.* = $11.25	20*s.* = $5 a week	Yes.
Clothing (men's and boys'),	Nov. 15, 1897 July 31, 1900 Nov. 25, 1901	7*s.* 6*d.* a day	45*s.* = $11.25	20*s.* = $5 a week	Yes.
Shirts, collars, and cuffs .	Jan. 20, 1898 July 25, 1898	—	—	{ 16*s.* = $4 a week { (4*d.* an hour)	Yes.
Underclothing (muslin) .	June 26, 1899	—	—	{ 16*s.* = $4 a week { (4*d.* an hour)	‡

Bread-making and Baking Board.

The history of wages in the baking business, the first industry to have a special wages board, reveals some of the difficulties of public regulation of wages. There can be no question that there existed much underpaying or sweating in this trade in Victoria, precisely as there does in this country at the present time. But the absence of piece-work left the board with few serious difficulties, and, as Mr. Reeves remarked, it met with little trouble. The minimum rate fixed for journeymen bakers in April, 1897, was 1*s.* an hour, or 48*s.* for the forty-eight hour week. In

* An earlier determination of 7*s.* 6*d.* was with hours.

† This is the rate for the *majority* of skilled occupations in the industry.

‡ Piece-rates may be fixed by employer, provided the average worker is able to earn the minimum thereunder.

1900 the rate was slightly advanced (12½*d.* per hour, or 50*s.* a week), and a scale established for apprentices and improvers. The average week wages of men and boys employed in the trade was reported by the chief inspector of factories to be 32*s.* in 1896 before the determination, 37*s.* in 1897, 40*s.* in 1898, 42*s.* in 1899, 44*s.* in 1900, and 42*s.* in 1901. Judged from employers' returns of wages, therefore, the minimum wage law was a marked success, for it had increased the average wage by about 30 per cent.

But at the very outset complaints came in from the pastry cooks because they had not been included in the determination. And this defect afforded some employers a convenient means of evading the law. They could afford to pay the legal minimum for bread-baking thirty hours a week, so long as they were at liberty to employ the same men eighteen hours a week at pastry cooking, and pay them little or nothing. Hence many of them dismissed their pastry cooks, and contrived to obey the letter of the law, while paying their help considerably less than 48*s.* a week.

When the determination of a minimum wage for the pastry cooks in 1900 prevented such evasions, certain employers simply required their men to return on Monday part of the wages paid them on Saturday. The Commission found such collusion of common occurrence: one Melbourne employer said that out of sixteen shops in a certain suburb he did not believe that there were three which paid the minimum rate. The evidence of the Melbourne employees, although more guarded, was in the main to the same effect. The Commission, therefore, regarded "it as established on sworn evidence that the determination which fixed £2 10*s.* a week as the minimum wage for ordinary and inferior journeymen was not honestly and faithfully carried out in a very large number of cases."

Another difficulty mentioned by the Commission is the undercutting of the one-man bakery. The working proprietor, to whom, of course, the wage law did not apply, is an important factor in the baking trade everywhere.

In Victoria there were in 1901 449 bake-houses and only 981 employees. The competition of the one-man shop was so severely felt by the larger establishments that the idea of public regulation of the price of bread was advanced by witnesses on both sides. In fact, the situation in this industry was so bad that the Commission declared that "no effective settlement of the matter is to be arrived at until the whole of the conditions of the trade are again investigated and the minimum wage question dealt with anew by an impartial tribunal."

The Furniture Board.

Chinese competition is the cause of sweating in the furniture manufacture of Victoria and other Australian colonies, and in attempting to abolish sweating by the establishment of a minimum wage Victoria has met with only partial success. In order to prevent Chinese control, Parliament provided that the members of the special wages board should be appointed instead of being chosen by employers and workmen, like the other boards. The first determination, which became effective April 19, 1897, fixed 7*s.* 6*d.* a day, or 45*s.* ($11.25) a week, as the minimum wage of experienced male employees, and 20*s.* ($5) as that of experienced female workers. In October, 1898, the men's minimum was advanced to 8*s.* ($2) a day; and in August, 1900, the scale of wages of improvers was amended without change in the minimum for skilled workers.

The wages returns of manufacturers (European) reveal an advance in wages since the determination took effect, thus:—

October 31.	Males, all adults.				Females.	
1896	—	29*s.* 7*d.*	—	—		14*s.* 1*d.*
1897	—	35*s.* 8*d.*				
1898	679	36*s.*	441	47*s.* 1*d.*	50	19*s.*
1899	754	38*s.* 10*d.*	497	49*s.* 2*d.*	88	15*s.* 3*d.*
1900	737	40*s.* 5*d.*	511	50*s.* 1*d.*	47	13*s.* 3*d.*
1901	795	40*s.* 2*d.*	541	50*s.* 7*d.*	56	18*s.* 1*d.*

The "adults," it may be explained, are experienced hands who get at least the minimum wage.

The Chinese returns yield an average weekly wage of 45*s.* 7*d.*, or $1.35 more a week than the European. This is a sufficient commentary on the astuteness of the Asiatics in evading the law. As a matter of fact, collusion between the Chinese workman and his employer could not possibly be prevented, even when the department of factory inspection employed an expert. The law, therefore, handicapped the white manufacturers who had to pay the minimum wage. Their business was nearly at a standstill, while the Chinese trade was expanding.

But the worst form of competition was that of the solitary Chinese manufacturer working without employees. The Commission paints a very dark picture of the physical and moral degradation of these Chinese, who are obnoxious even to Chinese journeymen in factories; while the Chinese factory owner was even more emphatic in his denunciation. The proposal to license a certain number of Chinese factories, with a minimum number of employees, was adopted by the Commission as one of its recommendations on the subject of Asiatic labor.

The export trade in Victorian furniture suffered a marked decline after 1897, but the Commission demonstrates that the decline was due to conditions in western Australia, which had been Victoria's principal customer; for a few years prior to 1898 there had been an unusual demand for furniture in western Australia, owing to the increase of settlement caused by the development of the gold fields.

Boot and Shoe Board.

This board had a long, hard struggle in arriving at a determination. The representatives of employers and employees divided into two camps, and failed to elect a chairman. The governor, under the law, appointed a chairman, —a former police magistrate. The partisans still refused to "get together," but left almost every decision to the

casting vote of the chairman. The board held its first meeting in February, 1897, and made its determination in August. It fixed the minimum wage for skilled workmen at 45*s*. a week, this being the chairman's compromise between the employers' offer of 30*s*. and the workers' demand of 60*s*. The employers strenuously opposed the rate fixed for men, although they made no objection to that fixed for women (20*s*. a week). They declared it meant the loss of their export trade, and even part of the home market; and they protested so vigorously that the minister refused to promulgate the award, but instead sent it back to the board. By the casting vote of the chairman the rate was reduced to 36*s*.; and the amended award was gazetted December 24, and went into force December 29, 1897.

The first year's work under the award was generally unsatisfactory. The employees bitterly complained that the amended rate was too low. Employers complained that the piece-prices fixed were too high, and the official returns showed that only 300 out of 3,629 employees were piece-workers. The result was that the old and slow workers were discharged, as they could not earn the weekly minimum, and only the best and quickest workers employed. The following year (1899) was another trying year on account of advances in the price of leather. But complaints against the law were ceasing, prosperity was returning, exports increased, the minimum wage was raised in 1898 to 42*s*. a week, and in 1902 restored to 45*s*.; and the Commission found that even this rate was generally paid, although some of the smaller shops evaded the law through the collusion of employer and employees.

It is now clear that the troubles of 1898 were due, not to the minimum wage law, but to the introduction of machinery, which was affecting the shoe trade in all the colonies about that time. Machinery displaced workmen, and made piece-work almost impossible, irrespective of the schedule of piece-prices. Without the minimum wage

law the competition of displaced workmen would almost inevitably have driven down wages and made the situation much worse than it actually was. After 1899 trade picked up, and the manufacturers began exporting largely to the other colonies,* especially to New South Wales. While a number (forty-seven) of the smaller factories closed, the total number of employees increased. There was thus a natural selection of employers who could succeed in business without cutting wages. The general increase in wages is shown in the following table, compiled from the factory inspector's reports:—

	All employees.	Males.†	Females.‡	
			All classes.	Adults.
1896 . .	— 23*s.* 2*d.*	— 26*s.* 10*d.*	— 13*s.* 4*d.*	
1897 . .	— 23*s.* 3*d.*			
1898 . .	3,629 27*s.* 7*d.*	2,475 33*s.* 8*d.*	1,154 14*s.* 7*d.*	545 21*s.* 0*d.*
1899 . .	3,922 27*s.* 10*d.*	2,756 33*s.* 4*d.*	1,166 14*s.* 11*d.*	575 21*s.* 4*d.*
1900 . .	3,932 27*s.* 11*d.*	2,628 34*s.* 5*d.*	1,304 14*s.* 7*d.*	588 21*s.* 11*d.*
1901 . .	3,988 28*s.* 5*d.*	2,729 34*s.* 6*d.*	1,259 15*s.* 3*d.*	542 21*s.* 8*d.*

While the official returns almost always overstate the actual wages paid, owing to the fact that a few employers do not really pay the amounts entered in the wages book kept for official inspection, there can be no question about the really notable improvement since 1897. The average wage for all classes of employees has increased more than 20 per cent., although as a result of improved organization manufacturers figured the increase on their pay-rolls at only 10 per cent.

* The exports of Victorian boots and shoes are stated by the Commission as follows:—

Year.	*Pair.*	*Value.*
1896	171M	£37,619
1897	228	48,213
1898	181	40,960
1899	190	45,823
1900	248	61,463
1901	275	65,462
1902 (9 mos.)	586	136,853

† Minimum wage for majority of skilled workmen: December 29, 1897, 36*s.*; July 18, 1898, 42*s.*; June, 1902, 45*s.*

‡ Minimum wage for skilled female hands, 20*s.*

MEN'S CLOTHING.

The clothing trades are the typical "sweated" industry; that is, they are peculiarly subject to the evil conditions enumerated by the British Commission of 1890 as constituting "sweating":—

(1) An unduly low rate of wages.

(2) Excessive hours of labor.

(3) The insanitary state of the houses in which work is carried on.

"These evils," continues the report, "can hardly be exaggerated. The earnings of the lowest classes are barely sufficient to sustain existence. The hours of labor are such as to make the lives of the workers periods of almost ceaseless toil, hard and unlovely to the last degree. The sanitary conditions under which the work is conducted are not only injurious to the health of the persons employed, but are dangerous to the public, . . . as infectious diseases are spread by the sale of garments made in rooms inhabited by persons suffering from small-pox and other diseases."

"Sweating" existed in Melbourne in all its hideousness and pitifulness. Investigations made by a board of inquiry which sat in 1893 disclosed a condition of things, says the report of the present Victorian Commission, which could only be paralleled in the most poverty-stricken quarters of the East End of London. "The people who enabled the sweater to get his profit were women and girls, living in poor homes and lodgings, and pinched by extreme want. These helpless creatures, beaten down by the sweater to accept as payment sums ranging from $1.80 to $3 for working seventy to eighty-four hours a week, managed to obtain food and clothing of a kind, and thus by painful and health-breaking toil eked out a wretched existence."

The difficulties of dealing with the sweating system are sufficiently appreciated in America and England, where statute has followed statute in the hope of eradicating at least the worst of the evil. To attempt to fix a scale of

wages that will be adhered to by myriads of small contractors and home workers seems, indeed, the height of folly. Nevertheless, the testimony of the chief factory inspector and the verdict of the Commission reached, after hearing evidence from employers and employed, agree in attributing almost complete success to the minimum wage law in abolishing sweating.

The determination of the special wages board in the men's clothing trade went into effect in November, 1897, being the third determination under the minimum wage law. It prescribed for the custom, or order, trade a minimum rate of 7*s*. 6*d*. a day for journeymen and 3*s*. 4*d*. a day for experienced female hands (45*s*. and 20*s*. a week of forty-eight hours for men and women respectively). A scale was also fixed for apprentices and improvers of each sex and piece-work rates for every garment. The schedules of prices in both the order and ready-made trade occupied thirty-four folio pages in the *Government Gazette*. But the piece-rates were fixed so high that employers soon discarded them altogether, and employed time workers almost exclusively.* This meant the substantial abolition of home work, which is always piece-work.

The hardship imposed upon widows with children and other home workers does not seem to have been great. The majority of the home workers went into factories, where by ingenious organization for the purpose of securing the full advantages of the division of labor their employers made them earn the minimum wage without difficulty. Some who could not conveniently leave the home secured work in the shirt or underwear trades, and a few obtained special licenses to work below the minimum rate. The excessive competition of home workers, underbidding one another by reason of their ignorance of the value of their work, and thus bringing in the evils of sweating, was effectually stopped. The manufacturers' returns of wages to

* The board intentionally made piece-rates rather high in order to allow the home workers something for carriage, fuel, etc.

the chief factory inspector reveal the following changes in the average wage since 1896:—

	Males.		Females.	
	No. employed.	Average weekly wage.	No. employed.	Average weekly wage.
1896 . .	782	35*s.* 3*d.* = $8.81*	2,601	15*s.* 5*d.* = $3.85
1897 . .	990	35*s.* 8*d.* = 8.91	3,339	15*s.* 8*d.* = 3.91
1898 . .	939	39*s.* 6*d.* = 9.87	3,545	18*s.* 3*d.* = 4.56
1899 . .	1,024	39*s.* 5*d.* = 9.85	3,940	18*s.* 6*d.* = 4.62
1900 . .	902	42*s.* 4*d.* = 10.58	3,935	18*s.* 1*d.* = 4.52
1901 . .	1,093	40*s.* 5*d.* = 10.10	4,062	18*s.* 3*d.* = 4.56

These wages, it must be remembered, are the average of adults and children, which explains the slight fluctuation from year to year, as the proportion of children varies. In 1900, for example, the wages board altered its determination so as to allow one female apprentice or improver to each two women earning the full minimum (the former ratio having been 1 to 3): hence the decrease in the average wage of female employees in that year. The increase in earnings revealed in the foregoing figures does not fully measure the real advance; for the averages of 1896, the year before the determination went into force, include few, if any, of the out-workers, who were, of course, the most poorly paid workers. Now the number of home workers is too small to deserve mention, and would scarcely affect the average in any event.

So far, then, as doing away with sweating in its worst form, the act has been a distinct success. There have been, of course, some dissatisfaction and some complaints. During the months in which the wages board was occupied in arriving at its determination, manufacturers worked overtime to accumulate a large stock of garments made up at cheap wage rates. Hence for some time after the

*Ratio used, 1*s.* = 25 cents.

minimum wage came into force there was a scarcity of employment. When business resumed its normal condition, the manufacturers complained of a scarcity of labor, and argued that the proportion of apprentices was too small to keep up the supply of skilled help. The ratio of female improvers to skilled hands was altered in 1900, as mentioned above; and, while complaints have continued, the Commission is inclined to attribute scarcity of help to the unwillingness of large employers to teach apprentices the trade as much as to the limitations in the law.

The Commission also points out that the fears of manufacturers about the loss of the export trade have not been realized. "On the contrary, the command of the interstate markets has resulted in a considerable expansion of exports of apparel from Melbourne.* The fear of immediate competition from Sydney has proved equally illusive, since the award of the New South Wales Arbitration Court has brought wages in the clothing trade practically to the level of Victorian rates."

Virtually, the only complaint that impressed the Commission pertained to the undue representation of the custom tailors on the wages board. As they numbered about 500 to only 30 manufacturers of ready-made clothing, they elected four of the five representatives of the employers. The manufacturers affirmed that, with only one representative in the board, their interests in the determination of wage rates were not properly conserved. In 1900 the manufacturers were allowed to elect three of the five employees' members, but they still complained that the tailors' representatives did not understand the peculiar conditions of the ready-made business.

*The exports of apparel, of Victorian origin, were as follows: 1896, £121,287; 1897, £138,715; 1898, £112,886; 1899, £122,608; 1900, £149,834; 1901, £160,484; 1902 (9 months), £232,652.

Muslin Undergarments.

Pitiful as are the conditions of labor in the trades concerned with the manufacture of ready-made clothing in all large cities, they shine in contrast with conditions in those smaller branches of the needle trades wherein even less skill is required,—namely, the white goods or muslin undergarment trade, which are conveniently classified in two industries: (1) women's and infants' wear; (2) men's garments. This is the distinction drawn in the Victorian factory law, which provided two special wages board, one to deal with the manufacture of lingerie and the other with shirts, shirt fronts, pajamas, collars and cuffs. The former is the more important industry of the two in Victoria, and presented considerable difficulties to any scheme of wage regulation. The first wages board, appointed in 1897, after several months' deliberation was totally unable to arrive at a determination, and resigned. A second board, appointed in August, 1898, progressed slowly, and arrived at a determination in June of the following year. It covers the manufacture of "all articles of women's and girls' underclothing (except stays and corsets), also nightgowns, blouses, pinafores, aprons, and infants' gowns and underclothing." The kinds of garments herein comprehended were so numerous and the changes in design so frequent that the board was forced to abandon the formulation of a schedule of piece-prices. Its determination is therefore comparatively simple, consisting simply of the minimum wage for skilled hands, apprentices, and improvers, and the proportion of the latter to the former. As nearly all workers in this industry are women, only one rate was fixed for adults; namely, 4*d.* an hour, which is equivalent to 16*s.* ($4) for the forty-eight hour week. Two apprentices or improvers are allowed to each skilled worker, and the minimum rates to be paid apprentices or improvers are as follows: 2*s.* 6*d.* (36 cents) a week for the first six months at the trade; 4*s.* ($1) for the second six

months; 6*s.* 6*d.* ($1.50) for the second year; 9*s.* ($2.25) for the third year; 12*s.* ($3) for the fourth year; 15*s.* ($3.75) for the fifth year; and thereafter not less than 16*s.* ($4). In lieu of a schedule of piece-rates the board determined that the rate to be paid by the employer for piece-work should be "at least such a sum as will enable an average worker to earn fourpence an hour." In order that piece-work prices should be net, employers were required to furnish all materials free of charge.

A little reflection will reveal the weakness of such a determination, which allows the employer to fix the piece-rates. What is an "average" worker? No two employers would agree in selecting the average worker, and the probability always exists that the worker selected as the average will be a very competent, rapid hand. However, all witnesses agree that the minimum wage law has effected great improvement in a trade that was always a refuge for the destitute. As already noted, upon the substantial abolition of home work in the ready-made clothing trade, many married women, who could not leave their homes to enter factories, obtained employment in the underwear trade. Others, unable to earn the higher minimum ($5 instead of $4 a week), also crowded into this trade; while the liberal allowance of apprentices (two to each skilled worker, as contrasted with the ratio of 1 to 3 in the clothing and shirt-making trades) permitted an increase in the proportion of girls earning less than the regular minimum. The fact that the average weekly wage of all women and girls increased from 11*s.* 3*d.* ($2.70) in 1898 to 12*s.* 5*d.* ($3) in 1901, while the average wage of adult females was 17*s.* 9*d.* in 1901, is some indication of the improvement. The Commission regards the situation in this trade with satisfaction, but points out the increasing danger from the competition of Syrians who make blouses and underclothing in family work-rooms away from official supervision. Subsequently, in detailing with Asiatic labor, the Commission recommends that they be licensed.

For the other branch of the undergarment trade (the

manufacture of men's white goods), little needs to be added to the preceding account. The special wages board arrived at its determination on January 18, 1898, and it went into force two days later. The minimum wage fixed was 4*d*. an hour, or 16*s*. a week,—the minimum subsequently adopted by the women's muslin wear board. Only one apprentice or improver is allowed to three skilled workers, and the minimum rates for improvers varies from 2*s*. 6*d*. to 12*s*. A girl seventeen years old receives from 6*s*. to 12*s*., according to length of experience. The former is paid if she has just begun work, and the latter if she has worked at the trade from her thirteenth year. The attitude of the Commission may be comprehended from the following passage: "In a third case, a shirtmaker doing machining only got from 1*s*. 7*d*. to 2*s*. 2*d*. per dozen, and got through a dozen by working twelve to thirteen hours. Her average earnings were 1*s*. 7*d*. a day. If these low rates, with the inevitable accompaniment of extreme poverty, and too often ill-health arising from excessive hours of work and lack of nourishing food, are contrasted with the condition of affairs recorded in 1901, when the average wage of all women in the trade was set down at 16*s*. 10*d*. a week, while 134 earned on the average 20*s*. 8*d*. per week, it will be admitted as a fact beyond dispute that in this trade the factory law has broken down a hideous form of sweating and protected in no small degree an industrious and deserving class of women."*

* The following table has been compiled from recent reports of the chief inspector of factories and workshops: each column gives the number of employees of the class designated and their average weekly wages: —

Year.	Women's Underwear. [Determination June 26, 1899.]		Shirts, Collars, Etc. [Determination Jan. 20, 1898.]	
	Males.	Females.	Males.	Females.
1896 . .	—	—	—	— 14*s*. 5*d*.
1897 . .	—	—	—	— 14*s*. 7*d*.
1898 . .	—	904 11*s*. 3*d*.	29 31*s*. 5*d*.	629 15*s*. 3*d*.
1899 . .	9 26*s*. 9*d*.	1,128 12*s*. 4*d*.	51 26*s*. 2*d*.	778 15*s*. 4*d*.
1900 . .	17 32*s*. 3*d*.	1,148 12*s*. 7*d*.	32 35*s*. 3*d*.	697 14*s*. 8*d*.
1901 . .	11 31*s*. 7*d*.	1,235 12*s*. 5*d*.	39 35*s*. 4*d*.	874 14*s*. 8*d*.

Other Boards.

The operation of the minimum wage law of 1896 was on the whole so successful that among the amendments to the factory law in 1900 was one providing for the establishment at once of a seventh board to fix minimum wages for butchers. At the same time the friends of such governmental interference carried another amendment, under which a special wages board could be created in any industry upon the passage of a Parliamentary resolution, while the opposing party carried an amendment for the appointment of a Parliamentary commission to investigate the operation of the minimum wage clause and other features of the factory law. In 1900 resolutions passed the legislative assembly in favor of the establishment of special wages boards in 22 additional industries; but 2 industries (bedding and mantel-piece trades) were placed under the furniture board, so that at the end of 1900 there were 27 wages boards authorized. At the 1901 session of Parliament, 11 additional boards were authorized, making a total of 38 special wages boards, as follows:—

Industry.	*Date of Act of Resolution creating Wages Board.*
*1. Aerated water	Resolution of October 8, 1901
*2. Artificial manure	Resolution of December 10, 1901
§3. Bedsteads (metal)	Resolution of December 10, 1901
4. Boots and shoes	Act of 1896
*5. Brass working	Resolution of December 10, 1901
6. Bread	Act of 1896
7. Brewing	Resolution of October 31, 1901
8. Brick	Resolution of September 25, 1900
§9. Brushes	Resolution of October 8, 1901
10. Butchers	Act of 1900
‡11. Carriages	Resolution of December 19, 1901. *Suspended*
12. Cigars	Resolution of September 25, 1900

* Under the Factories and Shops Continuance Act of 1902, determinations in these six industries are to be made by a majority of seven out of ten, or four out of six members, exclusive of the chairman.

§ No information available concerning these three wages boards.

‡ Carriage board not to be revised, nor its determinations to operate.

Industry.	*Date of Act or Resolution creating Wages Board.*
13. Clothing (men's)	Act of 1896
14. Confectionery	Resolution of October 11, 1900
15. Cookerage	Resolution of September 4, 1900
16. Engraving	Resolution of October 11, 1900
†17. Fellmongery	Resolution of October 11, 1900
18. Furniture	Act of 1896
Bedding	
Wire mattresses	
Mantel-pieces	
*19. Iron foundries	Resolution of December 10, 1901
20. Jam, fruit, pickles	Resolution of October 11, 1900
21. Jewelry	Resolution of October 11, 1900
*22. Leather goods	Resolution of December 10, 1901
23. Malt	Resolution of October 31, 1901
24. Millet broom	Resolution of September 4, 1900
*25. Ovens and stoves	Resolution of December 10, 1901
26. Pastry cooking	Resolution of September 4, 1900
27. Plate glass	Resolution of October 11, 1900
28. Pottery	Resolution of September 25, 1900
29. Printing	Resolution of September 4, 1900
Printing (lithography)	
Printing (bookbinding)	
30. Saddlery	Resolution of September 25, 1900
31. Shirts, collars, cuffs	Act of 1896
32. Stone and marble	Resolution of September 4, 1900
33. Tanning	Resolution of October 11, 1900
34. Tinsmiths	Resolution of September 25, 1900
35. Underclothing (muslin)	Act of 1896
§36. Wicker goods	Resolution of October 31, 1901
37. Woodworking	Resolution of September 4, 1900
38. Woollen goods	Resolution of September 25, 1900

By a provision of the act of 1900 the factory laws were to remain in force for a period of two years (from May 1) and thence onward to the conclusion of the next session of Parliament. Parliament was, however, dissolved on the 15th of September, 1902, at which date the factory acts of 1896 and subsequent years expired. Within three

*Under the Factories and Shops Continuance Act of 1902, determinations in these six industries are to be made by a majority of seven out of ten, or four out of six members, exclusive of the chairman.

† New board to be appointed for fellmongery.

§ No information available concerning these three wages boards.

months, however, they were restored by the Factories and Workshops Continuance Act of December 5, 1902, which made certain modifications as to the wages boards, and provided that they should remain in force until October 31, 1903. Under the act of 1902 one board (carriage industry) was suspended. In a second trade (fellmongery; that is, treatment of sheepskins) a new board was to be established to make a more satisfactory determination than the first one; and in six other industries, in which the determinations had not gone into effect, the provision was made that new determinations should be made by a majority of seven out of ten, or four out of six members, *exclusive* of the chairman.

The Commission's report contains the minimum day or weekly rates of wages in twenty-seven industries. It excludes the complex piece-price schedules as having interest only for experts. Not much is said about the boards authorized since 1899. Among employing *butchers* the most frequent complaint pertained to what they termed the excessive reduction in the hours of work,—from 63½–67 to 52 a week. Employing *tanners* testified that wages had been increased 5 per cent., but the Commission reports that "in the best tanneries the award of the wages board had made little difference in the rates of pay," and that "the evidence showed pretty conclusively that the employers had few substantial complaints to bring forward." The *fellmongers'* board, on the other hand, had been unsuccessful. Strong partisan feelings were manifested by the employers and employees on the wages board; and when, with the chairman's casting vote, the employees' representatives had fixed the weekly hours at 48 instead of 54, the employers' representatives resigned, and no others would take the vacated seats. The government appointed as their representatives three employers and two workmen of other callings. The determinations of the new board were contested by the employers in the courts; and, upon being beaten, many of them closed their

works until the expiration of the law in September. The Commission says that "in the whole history of the wages board, there is no instance where the absence of conciliation and tact on both sides was so marked." As already mentioned, the act of 1902 provided for a new board in this trade. In the *woodworking* industry there was complaint on the employers' side about the limitation of apprentices, the authorized proportion of boys to men being no greater in ordinary box-making than in the skilled trade of cabinet-makers. The result of substituting men for boys in the manufacture of fruit cases had, in the opinion of the Commission, imposed a "somewhat serious tax on the fruit-growing industry"; but the employees' witnesses maintained that there had been an abuse of boy labor, which required restriction, unless boys were to take the places of their fathers and throw the latter out of work.

As to the wages boards in other industries, the Commission reported that the determinations had been in force too short a time for a sound judgment to be formed, but that no complaints of any substantial grievances had reached the Commission.

One of the defects of the special boards system noted by the Commission was the promulgation of inconsistent rates, for the same occupation, by different boards. Woodturners, for example, received $2 a day in furniture factories and cabinet-makers' shops, and $2.25 a day in timber yards. Engineers worked forty-eight hours, and received higher wages in timber yards than did those working fifty-seven hours in brickyards, etc.

Recommendations of the Commission.

The Commission accepts the principle of wage regulation, and declares "that there cannot, in the circumstances of the time, be any return to the old conditions of freedom of contract in factory labor": it recognizes its "duty not to destroy the good work already done, . . . but to so mod-

ify and correct the defects which experience has shown to exist." Experience had demonstrated that minor defects in the determination, such as misadjustment of piece-rates, or even in the proportion of apprentices, might usually be corrected through the governor's exercise of his power to suspend the operation of an award for six months; but, where the spirit of partisanship was strong, this mild power of review did not suffice to secure a corrected determination from the original board. The Commission, in fact, affirmed that the difference between success and failure depended upon the prevalence of a conciliatory spirit within the boards. Where an award had been made, after a long and fruitless discussion, by the casting vote of the chairman, it might not stand the test of a review if an appellate tribunal should be created; but, when the awards represent the sound judgment of a substantial majority of the whole board, they will probably endure. To minimize "the dangerous element of self-interest inseparable from tribunals composed almost wholly of persons engaged in the particular trade under review" (in which the prospects of methods of conciliation in a dispute are almost hopeless), the Commission recommends the adoption of the New Zealand system of territorial boards of conciliation chosen by the entire body of employers and workmen in the district, with a central court of arbitration presided over by a judge of the colony's highest court. Such conciliation and arbitration tribunals, argues the Commission, not only arrive at more satisfactory determinations of wages and other conditions of employment, but afford the additional advantage of doing away with strikes and lockouts. Among the changes that the Commission suggests in the New Zealand system is the enlargement of the powers of the district boards so that they may make an award for a period of six months, permitting the disputants to carry the award to the central court if they remain dissatisfied at the end of that period. The court of arbitration, in their scheme, is a court of appeals only. Other

changes favored by the Commission have been copied from the New South Wales system of arbitration.

Meantime every determination made by a special wages board should remain in force.

Apprenticeship.—Much consideration is given to this difficult problem by the Victorian Commission, which recommends that a system of indentured apprenticeship be made compulsory in the principal trades and manufacturing industries, and that provision be made in selected technical schools for a thorough course of training to be taken either in day or night classes by the indentured apprentices,—a system of combined instruction and practical training, it may be remarked, which is already being worked out in the leading industrial centres of the United States. The Victorian Commission would permit employers to take on such apprentices at a lower rate than the authorized way, provided he paid the difference into the funds of the technical school.

Asiatic Labor.—The Commission recommends that no person of an Asiatic race be allowed to work at any employment in the colony without a license; that the number of licenses in the furniture industry be limited to 300 persons, to be employed in not more than 20 factories; in laundry work to 150 persons, to be employed in not more than 25 laundries; and in the garment trades to 100 persons.

The Commission also makes recommendations concerning legislation for employees in stores, trade, and commerce, favoring a "shops" law distinct from the factory law; but this part of the report cannot be reviewed in the present article.

A. D. WEBER.

NEW YORK STATE DEPARTMENT OF LABOR,
ALBANY.

THE HOLYOKE CASE.

HOLYOKE, Massachusetts, has been compelled to purchase gas and electric plants at a cost of more than $700,000, with the obligation to pay a perpetual rent for water power of $18,750 annually. This is the result of a suit brought by the Holyoke Water Power Company under the Municipal Lighting Act (St. 1891, ch. 370, and St. 1893, ch. 454).

In 1896, and again in 1897, the city council of Holyoke passed an order by a two-thirds vote in favor of a municipal electric lighting plant; and this order was ratified by popular vote of the municipal election of December 14, 1897 (1897 R. 52; 1898 R. 44, 45). The Holyoke Water Power Company began their action in the Supreme Judicial Court on March 5, 1898 (H. I. 1), to force the purchase of both their gas and electric plants by the city, and the decree of this court against the city was entered November 18, 1902 (H. xx.). In return for its modest desire to own a municipal electric plant, Holyoke, after more than four years of expensive litigation, thus finds itself burdened with both gas and electric plants in large part of ancient construction and at a price that will be shown to be far beyond their real value.

The conditions under which gas and electrical supply were carried on in Holyoke and which led up to the determination of the city to operate a municipal plant were in some respects unique. Not only were the gas and electric interests in the hands of a single private corporation, the Holyoke Water Power Company, but the main business of that company related to the supply of water power from the Connecticut River. Such a condition exists in no other city of the State, and can hardly be supposed to favor rapid extensions and low prices in gas and electrical supply.

The Holyoke Water Power Company was incorporated

by a special charter in 1859 to maintain a dam across the Connecticut River at Holyoke and to operate canals there for the distribution of water power. By the act of incorporation the maximum capital stock of the company was fixed at $600,000, but in 1889 another act raised this limit to $1,200,000 (H. I. 60, 62). The Hadley Falls Company established a gas plant at Holyoke in 1849, and in the same year this plant was conveyed to the Holyoke Company, which continued to supply gas up to the time when the plant was turned over to the city under the court decree above noted. A further amendment to the charter of the Holyoke Company, in 1873, ratified its previous doings in the gas business, which appear to have been without legislative authority, and authorized the company to continue the general sale of gas under all the rights and restrictions of gas companies in general (H. I. 19, 60, 61). Electrical supply began in Holyoke in 1884 from a plant established by the Holyoke Electric Light and Power Company. The plant and business of this electric company was purchased in 1888 by the Water Power Company after the latter company had secured authority from the board of gas commissioners to engage in the electric business (H. I. 61, 331). The Holyoke Company paid $30,000 for the electric plant and business, and assumed the debts of the electric company under an agreement dated June 27, 1888 (H. I. 67). On June 30, 1888, the total liabilities of the electric company amounted to $43,273.14, including $30,000 in capital stock (1889 R. 160). Exclusive control of gas and electrical supply in Holyoke thus passed into the hands of a private corporation that was largely interested in a partially competitive line of business; and this condition was maintained up to December, 1902, when the plants were turned over to the city.

In the year ending June 30, 1898, during which the voters of the city ratified the order passed by the council for a municipal electric plant, the city was paying $100 to $115 per year for each arc street lamp of 1,200 nominal candle

power. This rate was higher than those paid for similar street lamps by the great majority of the towns as well as of the cities in the State (1899 R. 182–188). For incandescent electric lamps of 16 nominal candle power the meter rate, subject to varying discounts where large amounts of energy were used, was 1.25 cents per lamp hour. On the basis of a consumption per lamp of 56 watts, representing the ordinary efficiency, the rate just named amounts to 22.2 cents per kilowatt hour. This meter rate was higher than those in all the 32 other cities of the State with four exceptions, and higher than the rates in any of the towns, with eight exceptions (1899 R. 189–208) Under these high prices the income from sales of electrical energy in Holyoke increased much less rapidly than the like income throughout the remainder of the State. During the fiscal year ending June 30, 1898, the income from sales of electrical energy at Holyoke was 28 per cent. greater than the like income during the corresponding year of 1892. For the entire State the like electric income was 62 per cent. greater in the later than in the earlier year. This failure of the electrical business in Holyoke to keep pace with that in the remainder of the State could not have been due to lack of rise in its population; for during the decade from 1890 to 1900 the population of Holyoke increased 28.3, and that of Massachusetts 28.8 per cent. In the later year the population of Holyoke numbered 45,712. The Massachusetts Municipal Lighting Act above referred to provides that no city may establish a municipal gas or electric plant until a vote to that effect "shall have passed each branch of its city council by a two-thirds vote in each of two consecutive municipal years, and thereafter have been ratified by a majority of the voters present and voting thereon at an annual municipal election." The statute further provides that, after a city has thus decided to establish either a gas or an electric plant, the city shall purchase both the gas and electric plants within its limits if these plants are owned by a single corporation and that

corporation elects to sell its plants. In order to fix the liability of the city to purchase its plants under the act, the corporation owning the plants must file a schedule of the property to be sold, also the terms of sale, with the city clerk within thirty days after the popular vote by which the order to establish a municipal plant has been ratified.

The Holyoke Water Power Company decided to sell both its gas and electric plants to the city, and therefore filed a schedule of these plants with the city clerk on January 8, following the municipal election of December 14, 1897. The price demanded by the company for its gas and electric plants was $1,000,000; and the company further demanded that the city lease from it 16.5 mill powers of water at a yearly rental of $1,500 per mill power, amounting to an annual payment of $24,750 (H. I. 30). The city refused to pay the price demanded by the company for its plants, and the company filed a petition in the Supreme Judicial Court on March 5, 1898, asking that commissioners be appointed to value the gas and electric plants, and that the obligation of the city to purchase these plants be enforced (H. I. 1). The city subsequently answered this petition, and the court appointed three commissioners on May 12, 1898, pursuant to the terms of the Municipal Lighting Act, to determine what property the city should purchase and to fix its price (H. I. 5).

The large sum demanded by the Holyoke Water Power Company for its gas and electric plants created a desire on the part of the city to escape the obligation to purchase. Efforts were made on the part of the city to compromise the suit of the Water Power Company, and on May 16, 1899, the Holyoke board of aldermen authorized the lighting committee to make a contract with the Water Power Company to do the public lighting of the city for a period of fifteen years (1900 R. 45). This proposed contract, which contained various stipulations as to the rates for public and private service, was never executed, but another similar contract was authorized by a vote of the Holyoke board

of aldermen on January 3, 1900. This contract provided for public lighting in the city by the Holyoke Water Power Company during ten years, and bound the city not to establish a municipal gas or electric plant during that period. It was expressly provided in the contract that it should take effect only after ratification by a majority of the voters of Holyoke at an election held pursuant to a special act of the legislature to give the contract validity (1901 R. 56–63). This special act was subsequently approved June 21, 1900 (St. 1900, ch. 390), and a city election to ratify the contract was held at Holyoke on the 17th of July following (1901 R. 63). At this election 4,079 votes were cast, and of these 1,926 were for and 2,136 were against ratification, while 17 were blank.

The attempt at compromise having thus failed, nothing remained but to fight the case out in the courts.

In the trial before the commissioners appointed on May 12, 1898, one hundred and nine hearings were had, the first on April 5, 1899, and the last on March 8, 1902. Eight months after this last hearing the commissioners made their award, on November 15, 1902. The Holyoke Water Power Company and the city both waived objections to this award, and it was then confirmed by the court on November 18, 1902 (H. xx.). A delay in the hearings from May 12, 1898, to April 5, 1899, seems to have been due to the efforts of the city to compromise the suit as above outlined.

The points contested before the commissioners may be grouped under two main heads; namely, the property and rights to be transferred by the Water Power Company to the city, and the value of this property and rights,—that is, what the city was to pay for them. Section 12 of the Municipal Lighting Act provides:—

> When any city or town shall decide as hereinbefore provided to establish a plant, and any person, firm, or corporation shall at the time of the first vote required for such decision be engaged in the business of making, generating, or distributing gas or electricity for sale for lighting purposes in such city or town, such city or town shall, if such person, firm, or corporation shall elect to sell and shall comply

with the provisions of this act, purchase of such person, firm, or corporation, before establishing a public plant, such portion of his, their, or its gas or electric plant and property suitable and used for such business in connection therewith as lies within the limits of such city or town.

It should be noted at the start that the corporation or other owner of a plant is under no obligation to sell its plant to the city, but that, if the "corporation shall elect to sell," the city must purchase. The act does not therefore provide for a taking on the part of a city by eminent domain or in any other way against the will of the owners. The Holyoke Water Power Company, by its schedule filed with the city clerk of Holyoke January 8, 1898, elected to sell its entire gas and electric plants, and also offered to lease to the city 16.5 mill powers of water for use in connection with these plants.

The city is not obliged in all cases to take the entire property offered by a company owning plants within its limits, for Section 13 of the Municipal Act provides that the commissioners shall

Adjudicate what property, real or personal, including rights and easements, shall be sold by the one and purchased by the other, in accordance with the provisions of this act, and what the price, time, and other conditions of the sale and delivery thereof shall be.

The exact position of the city as to the plants of the Water Power Company was summed up by its counsel in the argument by saying,—

We do not want any of their property,—gas works, electric light plant, or water power; and, if we have got to take any part of it, we want as little of it as possible [H. xvii. 199].

Section 12 of the Municipal Lighting Act provides that, if a city would be at a disadvantage in the use of any property which it is obliged to buy, compared with the vendor, the commissioners may release the city from the obligation to buy such property

The electric plant which the company elected to sell to the city was equipped with both water wheels and steam engines, and either the water wheels or the steam engines

alone had sufficient capacity to operate all of the electrical machinery at full load. The practice of the company had been to operate the electrical machinery with water power nearly all the time, and to use the steam engines at only those times when water was not available in sufficient quantities. It was shown by one of the company's witnesses that the maximum load on the water wheels at the electric station was 552 horse power, or about 8 mill powers, and that this maximum was noted on a day in January, a month when electric loads reach their highest figures (H. I. 348). It was also shown by a witness for the company that the average load at the electric station during the twenty-four hours of a January day was 231 horse power, or less than 4 mill powers (H. iv. 224). In the original offer of the gas and electric plants to the city (H. I. 30), and also in an amended offer made during the progress of the case (H. viii. 271), the company proposed to lease perpetually for use at the electric light plant 16 non-permanent 24-hour mill powers of water at the fixed rate of $1,500 per mill power per annum.

A mill power was defined in the proposals of the company to be the right to draw thirty-eight cubic feet of water per second from the nearest canal of the company under a head of twenty feet, or a proportionately greater amount of water per second under less heads, representing about 65 horse power net from the wheels (H. iii. 221). In other words, the product of the number of cubic feet of water taken per second by the feet of its head shall be 760 for each mill power. The non-permanent power thus offered by the company was subject to the right of the company to discontinue it at any time when and as long as in the opinion of their engineer there was not enough water to supply both the users of permanent power and the electric station, besides certain other purposes (H. viii. 276).

The company contended that the commissioners had no power to vary the rental demanded for the water power, and that the entire 16 mill powers must be contracted for

by the city under a perpetual lease as appurtenant to the land on which the electric station stood (H. xvii. 74; H. xviii. 258). The city contended on the other hand that, as the company did not offer its lease of water power for valuation by the commissioners, as required by the statute, therefore the commissioners had no right to consider it or to make any award concerning it that would be binding on the city. As the water power plant would be of no use without the water power, the commissioners were requested on the part of the city to omit the water plant from the transfer unless the company tendered a lease of water power on terms indicated by the city (H. xvii. 303).

The amended offer of the company to the city included 41,289 square feet of land at the electric station, but this land was so restricted by the company that only 28,550 square feet could be built upon. To this amount of land the company claimed that the 16 mill powers of water were appurtenant in spite of the fact that no more than 8 mill powers were being used at the electric station. It appeared from a number of leases that were put in evidence that only 1 mill power had commonly been leased with each 12,000 square feet or more of land (H. xvi. 470–477). In contrast with these figures the company insisted that 1 mill power should be leased with each 2,500 square feet of land at the electric station, because 16 mill powers had been used there in and before 1895 when the water company furnished power to an electric railway. The lease offered by the company for 16 non-permanent mill powers provided for a rebate to the city for periods when the water could not be furnished; but, when the water was available, the lease required the entire rent to be paid, no matter how little water the city might require (H. viii. 271).

The power of commissioners to fix the price of the property which they decide that the city shall purchase is regulated by the Municipal Lighting Act, which provides that:—

> The price to be paid therefor shall be its fair market value for the purposes of its use, no portion of such plant to be estimated, however,

at less than its fair market value for any other purpose. . . . Such value shall be estimated without enhancement on account of future earning capacity, or good will, or of exclusive privileges derived from rights in the public streets. [St. 1893, ch. 454, sect. 5.]

In the valuation of the gas and electric plants the Water Power Company contended that the commission should award the aggregate cost of reproduction of the several parts of these plants in January, 1898, less depreciation. The company further contended that the valuation of its plants should be fixed by the capitalization of its net earnings at the date of the valuation (H. xvi. 56).

It was contended on the part of the city that the franchises of the company were not to pass to the city or to be valued, and that the sum represented by a capitalization of the profits of the company had nothing to do with the value of its plants (H. xvi. 56). The city further contended that, while the physical structure alone of the plants was to be valued, this valuation must apply to the plants as a whole for the purpose of their use. On the part of the city it was admitted that, in the words of the statute, "no *portion* of the plant shall be estimated at less than its fair market value for any other purpose" (H. xvi. 73), but it was contended that the purposes for which the different *portions* of a plant were valued must be consistent with each other. Just the opposite view was maintained on behalf of the Water Power Company, which insisted that the highest value of each part of their plants for any purpose whatsoever must be taken, and that the sum of these separate values would then represent the true market value of the plants (H. xvi. 69).

This theory of counsel for the company found specific application as to the land on which the gas works were situated. It was contended that the value of this land must be taken at the highest figure it would bring in the market for any purpose, and that to this value the cost of erection of the buildings on it should be added. As to this land, it was contended for the city that only the value of

the land for a gas-works site should be added to the cost of buildings to obtain the fair market value of the plant as a whole.

A fundamental distinction in the science of valuation rests at the bottom of the contentions thus made for the city and the Water Power Company respectively. To illustrate this distinction, take the case of a factory plant that has a fair market value of $100,000 as such, and let $50,000 of this total sum represent the market value of the land when it is to be used exclusively for factory purposes, while the remaining $50,000 represents the cost of construction for the factory buildings. Let it be further assumed that the land where the factory plant is located has a market value of $75,000 for retail stores if the factory buildings are removed, but that these buildings after removal are worth only $15,000. As the market value of the land plus that of the buildings after the latter are removed will be only $90,000, it will not pay to remove them; and the greatest real value of the entire plant is its value as a whole. According to the theory of valuation maintained for the city, the fair market value of this supposed plant is $100,000, and no more. According to the theory of value maintained for the Water Power Company, the fair market value of this plant under the municipal lighting act is $125,000, because the value of the land must be taken at its highest figure for any purpose, and the value of the buildings must also be taken at its highest figure for any purpose. The fallacy of this method of valuation lies in the fact that the purposes for which the land and buildings are respectively valued are inconsistent with each other. Thus, if the land is used for stores, the purpose for which its value is the highest, then the factory buildings must be removed. On the other hand, if the factory buildings are to have their highest value, they must remain where they are, and the land cannot be used for stores. The method of valuation urged by the Water Power Company leads to the absurd result that the sum

of the values of the several parts is greater than the value of the whole. A reasonable construction of the statute seems to be that the city must pay the highest value of any portion of the plant for any purpose plus the value to which the other parts of the plant are thereby brought. Thus, if a gas plant as such is worth only $100,000, while the land on which it stands is worth $90,000 for some other purpose and the buildings when removed are worth $20,000, then the city should pay $110,000 for the plant.

On the part of the city it was contended that reproductive cost less depreciation was not a fair measure of the "market value" of the plants offered because they were of faulty design, and much of the equipment was of antiquated and inefficient types (H. xvi. 142). According to the view maintained for the city, the "market value" of the plants should be based on the cost of construction for new plants of equal capacity and efficiency, less the percentage of depreciation that had taken place in the existing plants.

The date of valuation agreed on by both parties to the suit and used as a basis in the testimony of witnesses was January 1, 1898 (H. xvi. 242, 293; H. xviii. 187). It was further agreed that besides the depreciation entering into the valuation of the plants as of January, 1898, further depreciation should be allowed from that date to the day of transfer of the plants to the city. Depreciation of the plants, according to the view of the city, included not only the physical destruction of their parts by wear and decay, but also the decrease in the value of the parts because of improvements in the art (H. xvi. 333–349). On the part of the company it did not clearly appear just what matters tending to the destruction of values were thought to be properly included under the head of depreciation, but it was insisted that depreciation in the particular plants could not be computed by percentages based on general results in similar plants, but should be determined mainly by inspection and then guesses or

tests as to how far the things inspected had decayed or worn out (H. xix. 293–312).

In cases of this sort it seems better to limit the meaning of depreciation to physical destruction of all sorts, so that depreciation charges will be limited to the annual amounts necessary to keep the plant the same as it was or as good as it was when new. If reproductive cost is taken to be the cost of a plant of equal capacity and efficiency with the one in question without regard to the reproduction of specific parts, this cost cuts off all value lost by advances in the arts. It follows that the present value of any plant may be found by the deduction of the percentage of purely physical depreciation from the reproductive cost just named.

Witnesses for the company based their allowances for depreciation on the idea that, if the parts of a plant have an average life in use of twenty years, the annual charge for depreciation should be a sum which, if put at interest each year, will aggregate an amount at the end of the twenty years equal to the value of the new plant. The fallacy of this idea was exposed on the part of the city, and lies in the fact that the annual depreciation charge must be invested yearly in the plant in order to keep it as good as it was and maintain its earning capacity. The depreciation fund cannot, therefore, be put out at interest. In the case assumed of a plant with a life of twenty years as to its parts, the yearly depreciation charge should be 5 per cent. of its first cost if the price of materials remains constant.

Water power consumed more time than any other subject at the trial of this cause (H. xviii. 257–319; H. xix. 1–166; H. xvi. 161–210, 462–523). This attention to the subject of water power was warranted, for according to the demands of the company the city was to be subjected to a perpetual annual payment as to the electric plant alone of $24,000 as rental for water power. A sum that capitalized at 4 per cent. represents an investment of $600,-

000. This yearly rental as fixed by the company was the price to be paid for the privilege of drawing 16 mill powers —or about $65 \times 16 = 1{,}040$ net horse power—of water from the canal of the company during every hour of the day, except certain hours on Sunday, and every day of the year. The privilege was subject to the important limitation that the engineer of the company might shut off the supply of water whenever he thought it advisable to do so. For days when the water was shut off the city was to be allowed a rebate. According to the view maintained by the company it was not competent for the commissioners to reduce the annual rent above named, either by lowering the quantity of water that the city should be obliged to pay for or by cutting down the yearly rate of $1,500 per mill power.

It was contended for the city that the rental charge of $24,000 for 16 mill powers was too high, because the electric lighting plant could use not more than 8 mill powers at times of day when the load was heaviest, and less than 4 mill powers for the average load during each twenty-four hours. The rate of $1,500 was also said to be too high, because a number of users of water power in Holyoke were shown to be paying not more than $600 yearly per mill power twenty-four hours daily, except Sundays and holidays. There was also a large amount of evidence which tended to show that a well-designed steam plant in Holyoke would operate the electric station at a lower cost than water at $1,500 per mill power yearly. It was shown that the electric systems in the near-by cities of Hartford and Springfield purchased energy from water-driven stations at much less than $1,500 yearly per mill power of maximum load. Whatever the rental awarded per mill power, it was the contention of the city that the rent should only apply to water measured and used. Besides the annual rental of $24,000, a bonus of $72,000 was demanded for the right to draw the 16 mill powers of water that were said to be appurtenant to the land on which the electric station stood.

Earnings and franchise value were urged by the company

as necessary factors to determine the market value of their plants, in spite of the words of the statute above quoted (H. xviii. 68–191). The position of the city was, on the other hand, that earnings and franchise rights could not be considered to fix the market value of the plants (H. xvi. 57, 58, 77–119). As the commissioners in their report distinctly stated that they excluded the franchise and earnings from the valuation of the plants, it is not necessary to follow out in detail the contentions of counsel on these points.

A factor of much importance in its relation to the value of the plants, as the award has proved, was their operation, or, in other words, that the plants formed a "going concern." It was claimed by the company and admitted by the city that something should be added to the physical value of the plants as compensation for the fact that they were in condition to operate and do business. At this point, however, the agreement ceased, for the ideas as to the value to be added to the plants by reason of their "going" differed widely. The view of the company was that the "going" feature of a plant was valuable only because the plant was making a profit and was to be measured by the amount of that profit (H. xviii. 170–185). This idea, if carried out, would obviously result in the capitalization of earnings and in franchise valuation under another name. Counsel for the company admitted this fact by saying that, if a capitalization of its net earnings showed that a plant had a total value of $700,000, and if the structural value of this same plant was $400,000, then the fact that the plant was a going concern should add $300,000 to its structural value. The contention for the city was that the "going" feature of a plant increased the value of the labor and materials expended on it only by the amount that would probably be required to pay interest during construction, an allowance for contingencies, engineering services and tests necessary to put the plant in good running order (H. xvi. 124–133, 350–352). In

the opinion of the city the value of a going plant is about 10 per cent. above that of the materials and labor that go to make it up.

If earnings are once admitted to show the value of the "going" or operating feature of a plant, it is hard to see how capitalization of these earnings and the consequent valuation of franchise and good will is to be avoided. As to any plant there are but two things of value,—its physical structure, on the one hand, and its business franchise and good will, on the other. It is impossible to pass beyond the material without entering the non-material portion.

The award of the commissioners, dated November 15, 1902, was in part as follows:—

> We have valued the property, by the consent of the parties, as of January 1, 1898, and in so doing have adopted the following rules:—
>
> We found,—
>
> 1. The value of the several parcels of real estate used in connection with the gas and electric plants for what they are worth in the market for the purposes of the use to which they are being put and are best adapted; *i.e.*, as a part of these plants.
>
> 2. The reproductive cost of all parts of the buildings and machinery that could be duplicated in January, 1898, and the market value of parts that could not be reproduced in the market.
>
> 3. Less depreciation of all kinds whatever in the existing plants upon that date, arising from age, service, wear, and tear, together with all defects therein, and all other causes and factors that lessen the value of the plants as they existed upon that date, and which would not pertain in any way to the reproduced plants. . . .
>
> We further considered upon this question all evidence tending to show that upon this date there could be obtained in the market buildings, mechanisms, and materials proper to be used in the making and distribution of gas and electricity that were cheaper and more efficient and which would produce more economical results in the plants in existence, or as they could be duplicated. In so far as these facts affect and depreciate the value of any part of the existing plants in the market, we reduce by so much our valuation of the same.
>
> It further appeared that the company, in 1898, had secured a large number of customers, with whom it had made connections and to whom it was supplying gas; that its gross earnings therefrom were about $80,000, and the profits arising therefrom were something in excess of $30,000; that the electric plant had also many customers,

and the company was making therefrom in 1898 a profit in excess of $20,000 out of its gross income (which was about $53,000). The company, therefore, will turn over to the city these plants, not only with a capacity to earn a profit, but having brought both into a prosperous and profit-paying condition. For this reason we think the value of the property has been enhanced in the market, and have allowed for the same in finding the fair market value.

While we excluded the petitioner's claim that we should value the franchise of the company employed in the gas and electric business, and have not enhanced the property on account of its earnings or earning capacity, whether in the past, present, or future, by using the same for the purpose of fixing the value of the plants by capitalization or as a basis for such valuation, yet we have considered the extent of the service done by the company in procuring customers, the prices charged by it for gas and electricity, whether it has so managed the business as to obtain (and has obtained) a profit therefrom, and the amount of that profit as evidence of how valuable, as going plants, the plants had become in the market, taken in connection with their condition, efficiency, and economy in operation, as well as any lack thereof, and all other facts relating to the plants as they were in January, 1898.

As may be seen from this quotation, the award of the commissioners is a remarkable document, even when considered by itself,— remarkable especially for the fact that it lays down two apparently antagonistic rules of valuation, and says that both of them were followed in relation to the plants under consideration. There may be minds that can understand how commissioners who "have not enhanced the property on account of its earnings or earning capacity" have considered "the amount of that profit as evidence of how valuable, as going plants, the plants had become in the market"; but to the ordinary understanding these two statements appear to be flat contradictions. The use of profits to determine how valuable "plants had become in the market" will appear to many persons, at least, to be the capitalization of net earnings and the valuation of franchises and good will, pure and simple, along with the physical structures of the plant. How can the profits be earned without the franchise to do the business? and of what use is the franchise save to earn

the profits? How can the amount of profit affect the market value of a plant save by capitalization of the profit?

In their award the commissioners named lump sums for the gas and electric plants respectively, but did not give the items of which these sums were made up, save as to the amounts allowed as bonuses for the rights to use water power at these plants. A schedule of the items of the award was given to counsel in the case by the chairman of the commission, but this schedule never became a part of the court record (H. xx. 170).

A summary of this schedule is as follows:—

Value of gas-plant buildings	$125,807	
Value of gas-plant machinery	170,504	
5 per cent. during construction	17,583	
20 per cent. going plant	62,779	$376,673
Value electric-plant buildings	$123,821	
Value electric-plant machinery	93,601	
5 per cent. during construction	13,008	
20 per cent. going plant	46,084	
	$276,514	
Bonus for water power	53,356	329,870
Total		$706,543

As to water power, the award provided that, in addition to the bonus of $2,250 in connection with the gas plant and $53,356 in connection with the electric plant, included in the above valuations, the city should pay forever to the company an annual rent of $18,750. This rent was made up of $750 to be paid for one-half mill power of water at the gas plant and $18,000 to be paid for 12 mill powers of water at the electric plant, at the rate of $1,500 per mill power. The bonus named for water power at the electric plant included the right to begin to draw and pay for 4 additional mill powers at the electric plant at any time within ten years from the date of its transfer to the city, at the rate of $1,500 per mill power yearly. It is safe to assume that this last-named right is one that the city will never care to assert. In the rate of $1,500 per mill power

per annum the company got all that they demanded, but the city was obliged to pay the rental of only 12 mill powers at the electric plant instead of the rent for 16, as the company had contended that they should. This award of water power rental against the city seems to be entirely too large, because it required the city to pay for 12 mill powers of water twenty-four hours per day when the maximum load on the plant was only 8 mill powers and the average twenty-four-hour load less than 4 mill powers. The rental also seems excessive compared with the market price of non-permanent water power in Holyoke. It was shown by the water-power leases of a number of manufacturing plants in Holyoke that $600 was the annual rate paid per mill power for non-permanent water, and in no case was it shown that a higher rate was being paid for this sort of power (H. xvi. 470–477). Every company operating an electrical supply system is required by law to make a sworn annual return of its business to the gas commissioners. In their return to these commissioners for the fiscal year of 1897, and again in 1898, the company included an item of $4,500 for the rent or value of water power used at their electric station. As the maximum load at the electric station was a little under 8 mill powers, the rate of $600 per mill power per year would amount to about $4,500. The gas commissioners have jurisdiction to regulate prices of electrical supply, and it was therefore for the interest of the company to make its operating expenses as large as possible and its net earnings as small as possible, consistently with the required oath. This fact furnishes a strong presumption that the rent of $4,500 for water power, as charged by the company against the electric plant, was all that this power was worth (H. xvi. 523).

The company originally demanded $1,000,000 as the value of their gas and electric plants in addition to the rent of water power. During the trial the company increased this demand by several hundred thousand dollars, basing the increase on the earning power of the property.

For the city it was contended that the gas plant should be valued at not more than $200,000, and the electric plant with its water-power equipment at not more than $140,000, including any bonus for the water power, making a total of $340,000 for the two plants. All companies operating gas or electric systems are required by law to make yearly reports to the gas commissioners, showing the cost and value of the physical property included in these systems. For some reason the reports of the Holyoke Company included only their electric plant, and not their gas plant. According to the report of the company for the year ending June 30, 1897, the value of its electric plant was then $141,197. The books of the company showed a total first cost of the electric plant to January, 1898, of $243,172.84, and from this cost various sums to the total amount of $101,975.47 had been charged off by the company on account of depreciation or otherwise, leaving the value of the plant at $141,197, as before stated (H. xvi. 450). As the reports to the gas commissioners are made under oath, and as it is to the interest of each company to make its assets appear as large as possible in order that its percentage of net earnings may appear small and the danger of a reduction in rates be diminished, there is good reason to believe that the figure of $141,197 given by the company as the structural value of its electric plant was all that it was worth.

As the value of the gas plant, the commissioners awarded a sum, above named, that was 88 per cent. greater than the structural value of this plant as fixed by the expert witnesses for the city at $200,000. As the value of the complete electric plant, the commissioners awarded a sum, already stated, that was 133 per cent. in excess of the $141,197 that the company had named in their sworn report to the gas commission, and that was shown by their own books to be its structural value.

To reach these results, the commissioners took certain figures as the market value or cost of each part of the

plants on January 1, 1898, if new, from the value thus taken for each part an amount representing depreciation was taken when thought necessary, and to the sum of these values 25 per cent. was added. Of this added percentage 5 was said to be for something during construction, and 20 was for the "going" of the plant.

An example of the way in which these costs or values of January, 1898, were arrived at may be seen in the case of the land on which the main part of the gas plant was located. This land measured 85,054 square feet, and the company demanded for it the sum of $42,527, or 50 cents a square foot. As vacant land, the site of the gas works without water power appurtenant thereto was valued by witnesses for the company at 40 to 50 cents per square foot, and by witnesses for the city at 20 to 25 cents per square foot. It was further shown that in three recent sales of land not far from the gas works and quite as well situated the prices were 12, 13.7, and 30 cents per square foot respectively (H. xvi. 294–296). Uncontradicted evidence given by experts for the city showed that large amounts of land, as well suited for gas works as that where the plant of the company was located, could be bought at 15 cents per square foot (H. xvi. 300, 301). The award of the commissioners as cost of the 85,054 square feet of land on which the gas plant stood was $40,826, with, of course, no deduction for depreciation. This award of 48 cents per square foot for land used for a gas plant, when other land equally suitable for this use could be had at 15 cents per square foot, seems to be a clear case of valuation at the highest value for any purpose, when this highest value could only be obtained by the dismantling and removal of the gas plant. As the gas plant was valued as it stood and not dismantled, the plant value and the land value are plainly inconsistent with each other.

An example of the way in which depreciation charges were applied to estimates of reconstruction cost may be noted in the case of the street mains of the gas system.

These mains were ancient, having been extended by gradual additions since 1849. Most of the mains originally laid seem to have been in use in January, 1898. The superintendent of the gas plant, a witness for the company, testified that he had held that position since 1890, that he had been in the employ of the company since 1875, and that he could not recall any instance where the original pipes had been taken up (H. i. 99, 135). More than one-half the total length of street mains were laid before June 30, 1888, for on that date these mains measured 81,333 feet in length, while on June 30, 1897, the length of street mains was 150,050 feet (1889 R. 38; 1898 R. 124). According to the testimony of a prominent gas engineer employed as a witness by the company, fifty years is the total life of street mains (H. ii. 264). Accepting this figure, it follows that the annual depreciation of such mains is 2 per cent.; and this should be figured as a yearly charge to that extent, and not on a sinking-fund basis for reasons previously given. In any event the sinking-fund basis of caring for depreciation can have no proper application in a case like the present, where time has run against the plant, depreciation has done its work, and the depreciated plant is to be valued. The bad design and depreciated condition of the street mains was indicated by the fact that their proportion of small pipes was unduly large and the leakage of gas unduly high, as shown by the figures for 24 other gas systems in cities of the State. These 24 systems were first selected for comparison by a witness for the company. In these systems during the year ending June 30, 1898, the leakage of gas was 7.3 per cent., and the proportion of mains having diameters of 3 inches and under to the total length of mains was 42.9 per cent. During the same year the leakage of gas from the Holyoke system amounted to 10.9 per cent. of the production there, and the ratio of length for mains of three inches and smaller diameters to the length of all mains was 54 per cent. (H. ix., 144). Witnesses for the company placed the reproductive

cost of the street mains at figures ranging from $65,000 to $83,000, including laying and the repaving of streets. Witnesses for the city named costs of $62,000 and $68,000 for the same work (H. xvi. 381). In the face of this testimony the commissioners awarded a reproductive cost of $84,046 for these street mains (H. xx. 172). This figure, being a higher one than any witness had dared to name, obviously is not intended to allow anything for poor design in the existing mains or for any other defects that do not come under the head of depreciation proper. This cost figure adopted by the commissioners thus left defects in the street mains of whatever nature to be compensated for under the name of depreciation. It is not entirely easy to fix on a fair total percentage of depreciation for a system of gas pipes one-half the length of which has been in the ground fifty years and the other half ten years. Any accurate computation should include the length of pipes of each size and the length of time that pipes of each size have been under ground. If the pipes were all of the same diameter, and equal lengths had been laid each year, the depreciation of the system from wear and decay at the end of fifty years would be approximately $25 \times 2 = 50$ per cent. Besides depreciation due to use and decay the city asked a reduction of $15,000 from the reproductive cost of the street mains for their other defects. On all of these facts the commissioners made a depreciation allowance of $8,405, leaving the net cost of the mains to the city at $75,641. In the light of the foregoing statements this allowance hardly needs comment.

On top of reproductive costs that were in many cases at or near the highest figures named by witnesses for the company and far above the costs contended for on the part of the city, less depreciation allowances of the sort just described, the commissioners added 25 per cent. to the amount of their award. 5 per cent. of this addition was said to be for interest during construction, and the other 20 per cent. was a reward for "going" and making profits.

This allowance for going was made in connection with the land which never went at all, just the same as in the case of the dynamos and water-wheels. Though the commissioners state that they "have not enhanced the property on account of its earnings or earning capacity," the fact remains that the city had to pay more for the plants than it would have paid under a fair valuation based confessedly on earnings, and thus including the items of franchise and good will. During each of the five years ending June 30, 1898, the net earnings of the company from both its gas and electric business were as follows, according to the sworn reports made to the gas commissioners:—

June 30, 1898	$58,496.82
June 30, 1897	22,332.44
June 30, 1896	46,719.68
June 30, 1895	64,282.14
June 30, 1894	57,235.65

The fall of net earnings between 1895 and 1896 was probably due to the fact that the company lost the electric railway business in 1895, which had previously formed one-half of the maximum load at its electric station. As to the notable change in net earnings between 1896, 1897, and 1898, it may be noted that the operating expenses reported by the company during these years were as follows:—

June 30, 1896	$76,572.73
June 30, 1897	89,026.16
June 30, 1898	59,877.29

In 1897 the agitation for municipal ownership in Holyoke was going on, and, if the company wished to discourage the idea, it would have been good policy to make its profits appear small. At the time of the 1898 report the company had begun action to force the purchase of its plants by the city, and in view of its strenuous contention that the plants should be valued on the basis of net earnings it was obviously desirable to make these earnings appear as large as possible. The net earnings as here stated have not been reduced by any depreciation charges as they properly

should be. The average of these net earnings for the three years after the loss of the street railway business in 1895 is about $42,000. If 1896 is assumed to have been a normal year and the report of its net earnings a fair one, the approximate market value of both the gas and the electric plant, including business, good will, and franchises, would be approximately $467,000 on the basis of a 10 per cent. capitalization. This 10 per cent. is probably as low a rate of capitalization as can properly be taken for these plants when sold to a single purchaser, judging by other sales of similar entire properties. Of course, a stock that pays 10 per cent. may sell at 100 per cent. above par value in small quantities, but the sale of entire properties is influenced by other considerations.

If this capitalization of net earnings is approximately correct, it appears that the $706,543 awarded by the commissioners as the amount the city must pay for the plants was 51 per cent. greater than their value based on entire earning capacity.

But this is not all. Prior to the year ending June 30, 1897, the reports of the company to the gas commissioners as to operating expenses at the electric plant included no charge for water power. In the reports for 1897 and 1898, respectively, an expense item of $4,500 for water power was inserted (H. ix. 163). As the city was condemned by the award to pay a perpetual rent of $18,000 per year for water power at the electric plant, this item becomes $18,000—$4,500 = $13,500 more than the amount allowed for it in the reports of operating expenses by the company to the gas commissioners. Deducting this item of $13,500 from the $46,700 of annual net earnings as reported leaves $33,200, which, capitalized at 10 per cent., gives the two plants a value of $332,000, or only 47 per cent. of what the city had to pay.

Having been generous towards the company, the commissioners could not afford to be niggardly as to their own services, and they accordingly demanded a compensation

of $41,000, and decreed that the amount be paid in equal parts by the city and the company. In their award the commissioners say that this compensation of forty-one thousand dollars ($41,000) was agreed upon by parties to this suit." It was said in the waiver of objection to the award on the part of the city:—

> The city of Holyoke, the respondent herein, while denying the statement contained in the award of the commissioners herein dated November 15, 1902, that the amount of said commissioners' fees was agreed upon by the parties, and the further statement therein that the apportionment of the payment of said fees between the parties hereto was left by them to the commissioners, does not desire to file formal objection to said award, and hereby waives all right to file objection thereto, and consents to the issue of a decree approving and confirming the same November 18, 1902 [H. xx. unnumbered page].

During the trial of this case the company remained in possession and operation of the plants, and the award authorized the company to retain all profits for this period. It was shown from the reports of the gas commissioners for the fiscal years of 1898 to 1901 that all the electric companies of the State devoted 12 per cent. of their gross income, on an average, to repairs and current renewals annually. It also appeared that the Holyoke Company devoted only 2.4 per cent. of gross income from the electric plant to renewals and repairs in the fiscal year of 1898, 3.2 per cent. in 1899, and 2.6 per cent. in 1900. In spite of these facts the commissioners allowed nothing for depreciation between January, 1898, and December, 1902, when the plants were transferred to the city, except to make no charge for some slight additions to the plants.

In view of the great cost of the litigation, the evident intention of the company to let the plants run down while they enjoyed the profits of their operation, and of the improbability that the award made by the commissioners would be greatly modified by the court, the decision of the city to pay the award and get possession of the plants without further delay seems to have been a wise one. It was strenuously contended for the company that it was obliged

to sell its plants to the city because municipal competition would be ruinous (H. xviii. 29, 30, 82, 103, 157, 180, and 181). The good faith of this contention was made plain by the subsequent application of the company, in 1903, to the legislature for authority to erect and operate a system of electric power supply in Holyoke (House No. 705).

The foregoing award adds one more to the numerous cases* where cities and towns have been forced to purchase gas and electric plants from private corporations at excessive valuations, under the Municipal Lighting Act. Holyoke, by the publication of a complete report of this case in twenty volumes, has left a record that should indicate to other cities and towns of the State what they may expect under existing laws. Those who think that cities and towns are incompetent to operate gas or electric plants will no doubt be able to point with pride to heavy interest charges and excessive costs of operation at Holyoke in future years.

In this paper the letter H. is used to refer to the report of the case published by the city of Holyoke, and R. is used to indicate the annual reports of the gas and electric light commissioners.

Many references are made to volume sixteen (xvi.) of the Holyoke report of the case, because this volume contains the exhaustive brief of counsel for the city in which references are collected for the entire mass of evidence.

ALTON D. ADAMS.

* *Political Science Quarterly*, June, 1902.

NOTES AND MEMORANDA.

EDITORIAL CHANGES.

THE editors of this *Journal* are pleased to announce that Professor Charles Jesse Bullock of Williams College has accepted a position on the Faculty of Harvard University, and that, beginning with September, 1903, he will be a member of our editorial board. Professor Bullock is already well known as an able and lucid writer on a wide range of economic subjects, and therefore needs no introduction to the readers of the *Quarterly Journal of Economics*. The editorial board is to be still further strengthened by the addition of Drs. Abram Piatt Andrew and Edwin Francis Gay. Dr. Andrew, who has been since 1900 instructor in this department, and has written some noteworthy articles on currency problems in different parts of the world, has been appointed assistant professor of Economics beginning September, 1903. Dr. Gay, who contributes a paper to this issue, came to Harvard in September, 1902, as instructor in economic history, taking up the work laid down by Professor Ashley the year before. Dr. Gay had previously spent several years carrying on investigations in the British Museum and in the Record Office, London, besides studying history in the University of Leipzig and economic history under Schmoller in the University of Berlin. He also has been appointed to an assistant Professorship, beginning with September of the present year.

"THE HIGGLING OF THE MARKET."

It is a common observation that economics is unfortunate because its scientific terminology is so largely drawn from the terms of every-day life. One danger growing out of this fact is that the mere naming of a problem by a simple and familiar word often gives the impression that the problem has been solved. It is a fallacy of this kind, which has existed for some time at a vital point in recent economic theory, that it is the purpose of this paper to discuss. It is the explanation of the determination of price within the area fixed by the marginal pair, by "the higgling and bargaining of the market."

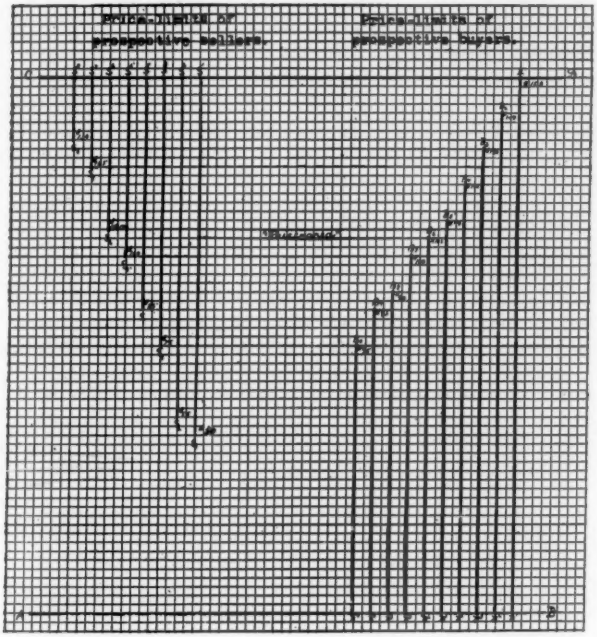
The theory of price promulgated by the Austrian economists is so generally accepted that a brief statement here will suffice for our purposes. Adapting the illustration of Professor Boehm-Bawerk* along the lines suggested by Mr. John A. Hobson,† let us suppose a market in which horses of uniform quality are bought and sold. Suppose "that all the competitors appear simultaneously in the one market," and that "buyers and sellers make no mistake about the actual state of the market, such as would prevent them from really pursuing their own egoistic interests." Designate the prospective sellers by the symbols S^1, S^2, S^3 etc., in the diagram, and the prospective buyers by the symbols B^1, B^2, B^3, etc.; designate their price-limits by the distances of the points S_1, S_2, S_3, etc., and of B_1, B_2, B_3, etc., from the base line A–B. The numerical valuations of these respective prices are stated in the amounts accompanying the corresponding symbols.

If the price asked is \$125 (S_7) or above, there will be more sellers than buyers, and competition will force the price down. If the price offered is \$100 (B_7) or below,

* *Positive Theory of Capital*, pp. 203, 204.

† *The Economics of Distribution*, p. 12.

there will be more buyers than sellers, and competition among the buyers will force the price up. If the price asked is \$107.50 (S_6) or above, there will still be more sellers than buyers, and competition of sellers will again force the price down. If the price offered is \$105 (B_6) or



below, there will again be more buyers than sellers, and competition of buyers will force the price up. In the words of Professor Boehm-Bawerk,* "In two-sided competition the market price is determined within a latitude of which the upper limit is constituted by the valuation of the last buyer who actually exchanges (the last buyer) [B^5] and that of the most capable seller excluded (the first excluded seller)

* *The Economics of Distribution*, p. 18.

[S^6], and the lower limit by the valuation of the least capable seller who effects a sale (the last seller) [S^5], and that of the most capable buyer excluded (the first excluded buyer) [B^6]." These four exchangers who fix the price limits are designated as the "marginal pairs." *

It is apparent that two upper boundaries and two lower boundaries to the price-area† are not necessary. The actual area, as Mr. Hobson has pointed out, is fixed by the price-limits of two persons, and not four. The upper limit is the price of the first excluded seller ($107.50), and the lower limit is the price of the first excluded buyer ($105). In the diagram the price range is represented by the distance between the horizontal lines B_6 and S_6. At any price within this range the number of buyers and the number of sellers are equal, and an exchange would accordingly seem possible.

A market price, however, in a market of the kind we have assumed, is not represented by an area or a straight line: it is represented by a precise point. It is a definite amount of money, not a great number of conceivable amounts. Hobson has severely criticised Boehm-Bawerk for marking off a price area in his discussion of two-sided competition, and not stating by what forces the actual price is fixed within this area.‡ "To fix limits for a price," he says, "is not to fix a price; and, curiously enough, Boehm-Bawerk leaves his analysis at this interesting point. . . . There is nothing in this analysis to show where it will be between these margins. Indeed, we may say that, if this were the whole process, no price could be fixed at all, and no sale would be possible, at any rate by economic settlement." While Boehm-Bawerk does not mention in his discussion of "two sided competition" how the price is fixed within

* It would be an interesting contribution to economic theory if some one could show conclusively that there is such a "price-area" as is here assumed, the reasons hitherto presented being singularly inconclusive. In a large market the distance between the upper and lower limits tends to disappear and the "area" to become a *point*.— ED.

† Strictly speaking, the price range is not represented by an area, but by a straight line.

‡ *The Economics of Distribution*, p. 14.

the so-called price-area, he does mention it in his earlier chapter on "one-sided competition," saying that within that field it is determined by "higgling." "Here," to use his own words, "there is room for any amount of 'higgling.' According as in the conduct of the transaction the buyer or the seller shows the greater dexterity, cunning, obstinacy, power of persuasion, or such like, will the price be forced either to its lower or its upper limit." President Hadley says, "If the transaction is an isolated one, and not one of a series of similar transactions, the price is usually fixed by bargaining"; and again, "the exact figure" depends "on the relative skill in bargaining shown by buyer and seller."* Hobson, in spite of his criticism of Boehm-Bawerk above mentioned, refers with apparent approval to Boehm-Bawerk's explanation of the determination of price within the price-area by the "higgling" of the market. "The work of competition," concludes Hobson, "is not to find a price, and there is no such a thing as a 'competition price': competition stakes off a ring, within which bargainers fight it out by force and craft. . . . By . . . fraud or force of superior bargaining the price-limits are drawn together so closely as to approximate toward a money point. . . . Some practice of fraud or force seems necessary to achieve a price point."† Thus, according to Hobson, the actual determinants of price within the price-area are extra-economic forces. They are such forces as "force," "bluff," "deceit," and "skill in bargaining." Explanations of this kind seem to have so far gone unchallenged among economists.

Strange anomaly it is, if market price, the central subject in economic science, the point towards which the forces of consumption and production converge, is determined by non-economic forces. To explain the determination of market price by reference to such forces as "the higgling and bargaining of the market" is little more than to give the problem a name. It reminds one of the explanation of the early physicists, that water rises in a vacuum tube "because nature abhors a vacuum." With equal propriety

* *The Economics of Distribution*, pp. 72, 73. † Ibid., p. 15 *et seq.*

the entire process of fixing the price-area might have been explained by merely saying that eight prospective sellers and ten prospective buyers met together in a market, and the price was determined by their "competition," or by "demand and supply."

If previous explanations concerning the determination of price within the price-area are unsatisfactory, what then, we may ask, are the forces which do actually determine it? In answering this question, should we not seek to analyze the forces at work within the area in the same way the Austrians have analyzed those which fix the area itself?

In a transaction of the kind under consideration there are many utilities and disutilities represented which do not find expression *directly* either in the money or commodity utilities on the part of buyers or sellers. If we are to determine the precise point at which the price is fixed, these utilities and disutilities must be taken into account.

Hobson gives hints of a solution of the problem, but does not develop them.* If A were selling, he says, and B and C were competing buyers, each placing the same valuation upon the horse, then A would choose one or the other, being guided in his decision "by some personal preference or the prospects of future business with the respective parties. . . . The actual price reached would assign to A the whole gain of the bargain less the minimum required to compensate B or C for the trouble of bargaining. But "the trouble of bargaining" represents a disutility to B and C just as truly as does the payment of money. Moreover, "personal preference or the prospects of future business" (if the market is a purely egoistic one, as assumed) represent utilities just as real as does actual cash.

The prospective traders have been in the market, and watched the progress of the trading. B^5 has seen B^6 drop out when it became evident that the price would be fixed above \$105. S^5 has seen S^6 drop out when it became evident that the price would be fixed below \$107.50. The previous bids and offers have, in fact, shown all parties the area within which the price is liable to be fixed. The most

* *The Economics of Distribution*, p. 6.

active "higgling" will naturally be between B^5 and S^5, they being the two traders whose gain from the transaction, as measured in dollars and cents, will be the least, and therefore presumably the ones to whom a small difference in price will have the greatest weight. S^5 will naturally be supported by the other sellers, and B^5 by the other buyers.

To all parties time is valuable, and to all parties "higgling," at least after a certain point is reached, becomes disagreeable. B^5 may be certain that, if he will "higgle" an extra hour with S^5, he will be able to reduce the price a dollar. He may think the gain sufficient to pay for the trouble, and accordingly continue his "higgling," or he may decide not to continue because "the game is not worth the candle." On the other hand, he may feel in doubt as to his ability to get better terms by further "higgling." In such a case he estimates the probability of his obtaining a further reduction; and this gain he compares with the probable loss by way of the disutility of further "higgling," and the balance of utility or disutility determines his decision. What is true of the buyer is equally true of the seller.

Each party to the transaction has the disutilities of the other parties to consider as well as his own. The disutilities of "higgling" are liable to increase irregularly and suddenly. Both buyers and sellers are men. They have tempers which "higgling" is very likely to arouse. They have, in varying degrees, a sense of personal dignity and independence. They dislike to make concessions. Circumstances are continually likely to arise in which they would rather sacrifice considerable in the price than "back down" after once committing themselves. If either party urges concessions too strongly, he is liable to make the other party angry, and suddenly bring all negotiations to a close. The angry man will go away in disgust, he may lose as far as the trade itself is concerned, he may "cut off his nose to spite his face"; but, from his point of view, his action is reasonable. The disutility of trading under such circum-

stances to him more than balances the utility to be gained. The probability of such an event is a disutility which each party estimates in a more or less sub-conscious way in naming his prices.

"Skill in bargaining" and "bluff" are likewise in a purely theoretical problem of this kind, from the point of view of the economist, questions of utility and disutility. The efficient "higgler" finds "higgling" more agreeable than does the inefficient one. Furthermore, he can accomplish more in a given length of time than his competitor: the disutility of a given amount of bargaining is therefore less. His advantage by "bluffing" merely means that, by reason of his greater skill or more ignoble methods, he can make the other party the more quickly conclude that further "higgling" will not pay. What has been said of "skill in bargaining" and "bluffing" applies equally well to the so-called factors of "force" and "deceit." *

All these things are real economic factors: they are elements in the determination of price, representing sacrifices to the buyers just as truly as does the payment of money, and sacrifices to the sellers just as truly as does the giving over of horses. Furthermore, they are in a semi-conscious way assimilated to the money sacrifice on the part of the buyers and the commodity sacrifice on the part of the sellers. Each party places his own estimations upon the subjective utilities and disutilities involved, whether they be certainties or risks. These subjective utilities vary with the characters and circumstances of the respective persons. To one man time may be of little value, to another it may have a high value: to the one bargaining may be agreeable, to the other disagreeable. One may be sanguine, and accordingly overestimate the favorable chances in a risk: the other may be pessimistic, and therefore underestimate them. One may have a better knowledge of conditions or be more skilful in a deal than the other. All

* Hobson's assertion, previously quoted, that "some practice of fraud or force seems necessary to achieve a price point," is undoubtedly an exaggeration. In many cases, fraud and force are comparatively unimportant factors, while in many others they are not present at all.

these factors and others enter into and help determine the respective estimations of utilities and disutilities on the part of the traders. There is always the danger of a disutility suddenly arising which will more than offset the utility otherwise to be gained from the exchange by one party or the other, and accordingly result in the breaking off of the negotiations. In such a case it is evident there will be an actual change in the price-area. This area is by no means fixed, and the possibility of either marginal buyer or marginal seller dropping out, and a new area thereby being established, is an efficient force in the fixing of the price within the price-area, just as the actual dropping out of prospective buyers and sellers was found to be an efficient force in determining the area itself. *The price within the area marked off by the price-limits of the marginal pair is fixed at that point where both buyers and sellers consider the actual and probable disutilities connected with further bargaining to offset the certain and probable gains to be obtained by such bargaining.*

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THE ADOPTION OF CHILDREN BY LABOR UNIONS.

A peculiar feature of trade unionism which has come to light in connection with the recent agitation in North Carolina for a law forbidding the employment of child labor is the "adoption" by several unions of Charlotte of children who had previously been compelled to work in the cotton mills of that city.

The first to take action in the matter was the Typographical Union, which in July, 1902, authorized its secretary to find the most deserving child and to place her name on the pay-roll of the union. After some investigation he selected a girl nine years of age who was then working "from daylight till dark" at $2.40 a fortnight. This child was the bread-winner of a family consisting of herself, an invalid mother and a brother too young to work. For some time the union continued to pay her an allowance equal to her former wages, with the understanding that she was to go to school instead of to the mill. Her spare time was to be devoted to recreation. Besides the allowance paid by the union, the members supplied her with books and clothing purchased by voluntary contributions. The printers were so well pleased with the results of their experiment that her allowance was increased from time to time until, according to latest accounts, she was receiving $4 a fortnight.

Several other unions soon followed the example of the printers, but none seem to have chosen more wisely the object of their altruism. In no case does the girl thus adopted appear to be the daughter of a deceased member of the union or to have a special claim of any sort upon it. In one instance the child has two sisters who work in the mills, but are not members of any union.

The method of caring for the children is the same with

all the unions. They continue to live at home, and receive an allowance which is at least equal to their former wages. In most cases the children are expected to go to school, and in any event they are not allowed to continue their work in the mills.

VANDERVEER CUSTIS.

ITALIAN ECONOMIC CONTRASTS.

A recent article by the Italian deputy, Signor Ferraris, in the *Nuova Antologia* draws attention to some aspects of the present economic condition of Italy, and seems well worth summarizing here. The contrast between national financial prosperity and the distressful poverty of an "exhausted" people, the *popolo smunto* whose burdens are described in Signor Ferraris's article, of itself deserves the consideration of economic students, apart from the general compassionate interest which Italy's sufferings have always aroused.

No great European state can show a more brilliant financial achievement than Italy during the last five years; but, on the other hand, no nation is so grievously taxed. National financial independence and the restoration of international credit have apparently been purchased at the expense of the economic and social well-being of the industrial and agricultural toilers. For the first time in the history of the kingdom Italian *rentes* have commanded a premium in gold on the Paris Bourse. Hitherto Italian 5 per cent. bonds have only on two occasions, and then but temporarily, been quoted above par: once during the administration of Cavour in 1852, and again after the completion of national unity in 1886. Foreign exchange has since October last reached and steadily maintained parity with the gold currency of France, Switzerland, Germany, and England,—an event unknown since the beginning of the financial struggle resultant from the abolition of the forced paper currency.

These three achievements—the present high standing of Italian *rentes*, the extinction of excessive fluctuations in foreign exchanges, and the substantial annual credit balances in the treasury—would appear satisfactory indications of

the confidence placed in the stability of the policy of retrenchment and sound finance so successfully pursued. The budget of 1901–02 closed with a surplus of $12,720,000, the balance between a revenue of $348,680,000 and an expenditure of $335,960,000, while the aggregate balance between revenue and expenditure during the last five years amounted to $42,400,000. From this balance $5,000,000 have been taken to defray Italy's expenditure in the late Chinese expedition, $19,000,000 were used in the development of the railroad systems throughout the kingdom, $4,800,000 were utilized in the liquidation of loans over and above the new obligations incurred, and $18,600,000 remain at the disposal of the treasury.

But this result has been purchased at a heavy sacrifice. Sidney Somnino, ex-Minister of Finance, has lately been quoted as stating that "agriculture is perishing, the country is being depopulated, and prosperity is being crushed. The only thing which swells and prospers is the blood-sucking octopus of usury." Emigration statistics indeed seem to bear out a portion of this assertion, for the exodus, temporary and permanent, across the Alps and over seas, has, during the last year, been unparalleled. Other competent Italian observers use less alarmist language, but there is general agreement as to the fact of wide-spread distress.

There is a similar consensus of opinion as to one of the chief causes of this distress. Taxation, national and local, is so heavy that its weight is reaching the limit of endurance. This burden is not a recent one: it has long been patriotically borne, since it has been recognized as an inevitable consequence of the onerous conditions imposed on state and local administrations by reason of the debts contracted or assumed during the struggle for political unity and national independence. It is also the direct and unavoidable inheritance of a hand-to-mouth financial policy which for years aimed only to meet day by day the emergencies created by a depleted public purse and the disastrous decline

of national credit at home and abroad. Political crises or international difficulties have still further complicated the situation, and reacted on the monetary and economic depression caused by the loss of foreign markets and consequent stagnation of home industries and glut of agricultural production. The evils of this unavoidable past are, as Signor Ferraris cogently remarks, grievously reflected in the fundamental construction of the existing fiscal system. Successive administrations have hitherto been busy performing feats of financial legerdemain for the attainment of the much-desired equilibrium of the national budget, and have given too little attention to the inequalities of a system of taxation which weighs with undue severity upon small incomes.

A radical reformation of this ill-adjusted fiscal system is recognized as imperative, as a measure not only of simple justice, but of political and economic expediency. Italian economists, however, differ as to the means whereby this end is to be accomplished. The national financial credit, and the equilibrium of the national budget, it is generally agreed, must be maintained at any cost. But on the question of the readjustment of taxation there is the usual divergence between the moderates and the radicals, the former advocating gradual rebates in proportion to the surplus, the latter a reform by the substitution of new taxes for the old ones to be abolished. While recognizing the advantages of the more sweeping reform, Signor Ferraris holds that, taking into consideration the state of public opinion in Italy, "for the present precedence should be given to the policy of rebates over that of extensive fiscal change." And with the maintenance of the surplus at the disposal of the treasury, by economy and skilful financeering, this moderate policy of rebates may be expected to afford substantial relief and opportunity for economic recuperation to the country.

As illustrating present fiscal conditions and the possibilities of curative treatment, it will be of interest to note

some steps of practical reform already taken or proposed. With the exception of the *lotto*, a government lottery, the production and sale of salt forms one of the most remunerative of the monopolies possessed by the state. Official figures for 1900–1901 demonstrate that every kilogram of salt produced costs the government about one cent and is sold at eight cents. The revenue netted by the sale of this commodity amounts to-day to a little over $15,000,000 per annum. Obviously, the burden of this excessive fiscal exaction falls upon the agriculturist and poorer classes of the population. Various suggestions have been offered for relief from this most vexatious imposition, it being very generally conceded that political and social considerations should outweigh financial objections. That most widely accepted is for an immediate rebate to be followed in the near future by further reductions until the price of four cents per kilogram is reached. This, it is claimed, would not in reality reduce the treasury receipts to the extent figures based upon the present revenue would indicate, as the consumption would immediately be increased, while the general economic conditions of the rural districts would be materially improved, and the very extensive smuggling of this staple of life could no longer be profitably carried on.

The importation of foreign cereals varies considerably from year to year; but Italy is as yet far from being able to supply the demands of her people, modest though these demands assuredly are. The average annual revenue derived by the treasury during the last ten years from this source is estimated at $11,000,000. The Italian's bread is subjected to two distinct forms of taxation before it reaches his table: a custom's duty on wheat, levied at the port of entry; and a communal (octroi) tax on flour, varying according to locality. $1.50 per quintal (about 220 lbs.) is collected by the National Customs, while as high as $1.40 has until recently been exacted by the communal octroi. The law of January 23, 1902, however, makes provision for the total abolition, within three years, of the com-

munal tax on flour, foreign and domestic. This instalment of reform, to which Baron Somnino by his writings and speeches has largely contributed, is welcomed as a present relief and as an earnest of further reductions on other food taxes.

Petroleum is another necessity which is heavily taxed. The commercial cost of refined petroleum for the last few years has averaged 17 lire (about $3.40) per quintal. To-day this commodity is taxed at the port of entry 48 lire ($9.60) per quintal, and an additional contribution, reaching at times as high as $2, is levied by the local octroi, thus raising the cost to the consumer to $15 per quintal. In France (1901) the minimum tariff was $2 per quintal on refined petroleum, and the average octroi tax added another 80 cents or $1 to the retail price, making a total of about $3 per quintal. The French importations for 1901 amounted to 3,797,000 quintals as against 700,070 quintals imported into Italy during the same period, and as against a population of forty millions in France and thirty-two millions in Italy. Yet the revenue from customs receipts in Italy amounted to 33,603,360 francs as against 35,864,000 francs collected by the French government on an importation over five times as large. True there is question of the establishment of a government monopoly of petroleum in France, and the Chamber of Deputies have voted (March, 1903) a comparatively insignificant additional tax of 30 cents per 100 kilograms.

As with salt, cereals, and petroleum, so also in the case of sugar and coffee, an excessive tariff, combined with onerous octroi duties, narrowly limits among the poorer classes the consumption of these articles. In 1871 the duty was 57.75 francs ($11.75) per quintal on coffee, and the total importation 131,124 quintals, with a total per capita consumption of 0.489 kg. In 1899–1900 the tariff rates which had been successively raised to 150 francs ($30) per quintal resulted, in twenty-nine years, in an increased importation of but eight thousand quintals (total for 1899–1900, 139,302)

and the reduction of the per capita consumption to 0.437 kg., less than one English pound. In July, 1900, the tariff was reduced to 130 lire ($26) per quintal; and this fact, combined with the lower prices prevailing in Brazil, immediately raised the importations from 139,302 to 160,622 quintals (1901–1902), while the per capita consumption increased from 0.437 kg. to 0.494 kg. France, whose tariff taxes coffee not grown in French dependencies higher than her Italian neighbors, shows, nevertheless, a per capita consumption of 2.19 kg. While this is due principally to the exemption from octroi duties on coffee, it is also in part attributable to the cheaper price of sugar in France.

Four years ago, when important fiscal sacrifices were decided on for the protection of the Italian sugar-refining industry and the home production of beet-root sugar, the measures adopted were primarily intended to foster the interests of manufacturing enterprise, and were not calculated to materially reduce the price of sugar to the consumer. That the measure not only increased the treasury receipts by about one million dollars where a loss had been anticipated, but raised the per capita consumption from 2.875 kg. (1899–1900) to 3.016 kg. last year, came as an agreeable surprise. This result, despite a fiscal imposition of $13.44 per quintal on the production of domestic sugar, supplemented in some instances by an octroi duty of $3 per quintal, would appear to counsel tangible concessions to a vast body of consumers ready to increase the demand for a staple article. Italy is as yet far behind the per capita consumption of sugar in France and Germany, the average being in the former country about 24½ pounds per inhabitant, and 28 pounds in the latter.

King Victor Emmanuel is said to have the interests of his poorer subjects close at heart, and to have given intelligent attention to the economic and social problems which vex Italian statesmen to-day. In his speech from the throne when opening the present Parliamentary session, he dwelt with impressive earnestness on the imperative necessity of

following up the fiscal reforms "which social justice dictates" by still greater efforts, "made more easy by reason of the prosperous condition of the national economy and the state finances." But the rejection of the scheme for the abolition of local taxation on food presented by the late minister of finance, Signor Wollenborg, is significant of the strong political prejudices which must be reckoned with even when dealing with a popular issue, the utility and economic advantages of which are recognized. Notwithstanding repeated disappointments, there would appear, however, to exist reasonable hope that the present Parliamentary leaning toward fiscal reform is sincere. The reduction of the price of salt has been agreed upon in principle: the lightening of other fiscal burdens now weighing with undue severity on the poorer classes will, it is to be hoped, speedily follow.

REMSEN WHITEHOUSE.

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CORRIGENDA FOR VOL. XVII., NO. 1.

On page 125, note, line 6, read *Recollections of the Last Ten Years* (1825). On page 125, note, line 7, read (1832).

On page 126, note, read Ramsey, *History of South Carolina.*

On page 139, lines 15 and 38, read State for States.

On page 154, line 12, read "North Carolina."

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